GUIDELINES

FOR LIVESTOCK WASTE MANAGEMENT

Prepared by
Hawaii State Department of Health
Wastewater Branch

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INTRODUCTION

As an island state, Hawaii needs to emphasize the importance of protecting the quality and quantity of its ground and surface water resources. The health of its people and industries, including agriculture, are dependent on the condition of these resources. Therefore, the prevention of water pollution is an important part of the state's overall program to assure its water resources will support a prosperous future.

The "Hawaii Right to Farm Act" is an important statute that farms as well as the Department of Health (DOH) has referenced to limit the circumstances under which farm operations may be deemed to be a nuisance. The act is extended to operations that were properly developed, are in compliance with requirements relevant to the nuisance complaint and are using reasonable care in conducting their operations. However, the act does not include alleged nuisances that involves water pollution or flooding. Therefore, it is imperative for each livestock operation reinforce the right to farm by ensuring that its operation is consistent with relevant statues and ordinances and that the sources of, and conditions under which they may contribute to water pollution or flooding are identified and properly managed.

The clean water legislative history was initiated through the "Water Pollution Control Act of 1948" which focused on the nation's interstate water pollution problems generated primarily from industrial and municipal sewage discharges. The "Water Pollution Control," "Water Quality" and "Clean Water Restoration Act(s)" that followed all resulted in increased federal funding of pollution control efforts and in the enforcement of environmental laws. A fundamental change in the structure and organization of water pollution programs was introduced with the "Federal Water Pollution Control Act Amendments of 1972." Its major provisions stated that all discharges were illegal unless they were in compliance with provisions of the Act and all point source discharges must obtain permits. With point source pollution programs well established, the "Water Quality Act of 1987" initiated the effort to address non-point source pollution problems. This was followed by the "Coastal Zone Act Reauthorization of 1990" which provides for the State to develop the State's coastal zone management program.

Agriculture activities were identified as one of several significant contributors to both point and non-point source water

pollution. Agricultural water pollution problems include soil erosion, and the leaching, overflow and discharge of chemicals, nutrients, and pathogens into ground and surface waters. Problems more specific to the livestock industry are related to its production and processing operations, and the management of process generated waste and wastewater. Management tasks faced by livestock feeding and processing operations include the collection, transfer, storage, treatment and disposal/reuse of process generated effluent, solids, sludge, and dead animals. Disposal options are limited and likely to be extremely costly. Therefore, the reuse, and more specifically, the land application and subsequent crop utilization is considered as one of the more cost effective options presently available.

Reduction and prevention of water pollution is obviously best accomplished at its source. Previously accepted waste management measures which today may need to include additional measures to their complement, appear to provide practical solutions. Existing livestock operations may find reasonable additional measures, and or just closer management of existing measures can satisfactorily accomplish their pollution prevention tasks. Market development for the sale of reclaimed waste residues as soil amendment and fertilizer products is revenue generating opportunity that has helped many farms to offset their waste management costs.

The implementation of pollution prevention measures is a farm's cost of doing business that does not necessarily generate any income or profit. In the interest to help offset these non-revenue generating costs and maintain stable and affordable food prices, farm financial assistance is made available to qualifying non-point source pollution control projects through the USDA Natural Resources Conservation Service (NRCS), Cost Share Assistance Program; Hawaii State Department of Agriculture, Farm Loan Program; and Hawaii State Department of Health State Revolving Fund (low interest loan program). In the 1995 Hawaii State Legislature, a version of the NRCS Farm Cost Share Assistance Program was proposed and supported by various representing agencies and organizations. Although the measure was not adopted, our legislators were made aware of the need for farm assistance. Future proposals and aggressive supporting testimony are needed.

PURPOSE

The purpose of this document is to outline roles and responsibilities of the livestock industry, their assisting agencies/consultants and the Department of Health (DOH) in the concerted effort to reduce and prevent water pollution, and to provide guidance to owners of livestock operations in obtaining approval from the DOH to construct and operate **a** livestock facility and waste system. It attempts to apply, clarify, and expand on principles expressed in current Federal and State regulations, (see Appendix 1 and 2). It is termed "guidelines" in that it may be modified, as permitted by regulations, until a clear and workable program among the livestock industry, assisting agencies/consultants, and the DOH is established. This should give planners, resource managers, and the livestock industry flexibility and time to evaluate and modify this document wherefrom the DOH may elect to develop administrative rules at a future date.

APPLICABILITY

This document is applicable to animal (livestock) feeding and processing operations with the following plans:

(1) New facility plans to construct and operate;
(2) Existing operations with plans to expand or modify their facilities/operations in a manner which could create new sources of water pollution;
(3) Existing operations with plans to abandon their facilities; and
(4) Existing operations subject to a pollution reduction program.

It targets animal feeding operations, large and small, for a variety of reasons. These reasons are that the average operation confines a significant number of animals in a limited area, waste is produced on a daily and long term basis, the reduction and prevention of water pollution is best and most economically achieved at its source during the initial planning/construction phase, proven pollution control technologies are available, and government financial and technical assistance programs are available.

Existing livestock operations and waste systems which were approved by the state and or their respective county agencies may be exempted from the provisions of these guidelines.

However, pollution control measures identified either voluntarily or through the "Pollution Reduction Program" will be subject to the provisions of these guidelines.

Understandably, there may be conditions under which it may be impossible or impractical to meet all Federal or State regulations including these guideline provisions for livestock waste management. Federal provisions must be implemented and administered in their entirety, and may only be superseded by imposing more stringent requirements. However, variances from State rules as provided, and exceptions to these guidelines which supersede Federal provisions may be considered and determined on a case by case and site specific basis. Procedures for obtaining a variance from State rules are outlined in the provisions of the respective Hawaii Revised Statues or Hawaii Administrative Rules. Exceptions to these guidelines may be proposed by petition to the DOH, Environmental Management Division, Wastewater Branch.

INTERAGENCY-INDUSTRY COMMITTEE

The interagency-industry committee is an advisory committee to the DOH that serves as a communication and resource liaison concerning matters related to this document. It will also serve as a forum through which proposals for exception from these guidelines, and pollution reduction programs, are reviewed and recommended. The DOH staff will serve as a resource to this committee.

The members of the interagency-industry committee are representatives from the following agencies and industries: State Department of Agriculture; Governor's Agricultural Coordinating Committee; Hawaii Farm Bureau Federation; Hawaii Association of Conservation Districts; USDA Natural Resources Conservation Service; University of Hawaii Cooperative Extension Service; Cattle Industry; Dairy Industry; Poultry Industry; and Swine Industry. Representatives will be nominated by their respective agency and industry. A list of these and other agencies is located in Appendix 9.

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM ("NPDES")

The NPDES permit program is administered by the State of Hawaii, Department of Health, Environmental Management Division, Clean Water Branch, under the provisions of Chapter 342D, Hawaii

Revised Statutes and Hawaii Administrative Rules, Chapter 11-55, entitled "Water Pollution Control."

According to the Code of Federal Regulation, Title 40, "Protection of Environment", Section 122.23, entitled "Concentrated Animal Feeding Operations" (CAFO), a CAFO is a water pollution point source discharge and is required to have a NPDES permit if it falls under any of three criteria:

1) Any animal feeding operation having over 1000 animal units.
2) Any animal feeding operation having over 300 animal units, and which discharges process waste pollutants directly into state waters through a manmade device, or when it discharges process generated waste directly to state waters that originate outside of and pass over, across, or through the facility, or otherwise come into direct contact with the animals confined in the operation.
3) Any animal feeding operation designated on a case by case basis to be a significant source of water pollution and thereby a concentrated animal feeding operation.

The NPDES program provides that no animal feeding operation is a CAFO, as defined above, if such animal feeding operation discharges only in the event of a 25 year, 24 hour rainfall event. Process waste pollutants in the overflow may be discharged only whenever rainfall events, either chronic or catastrophic, cause an overflow from a facility designed, constructed, and operated to contain all process generated waste plus the waste contaminated runoff from a 25 year, 24 hour rainfall event for the location of the point source, see Appendix 3.

If an operation qualifies as a CAFO as defined above and does not have an NPDES permit, any discharge occurring from the operation is a violation of the Federal Clean Water Act. The operation is thereby subject to enforcement action under the pollution reduction program, described below, and is also at greater risk of encouraging a third party lawsuit. In the interim preceding compliance, an NPDES permit and commitment to the pollution reduction program does not immunize the operation from an aggressive third party lawsuit. However, it does display formal recognition of, and commitment to correct the violation.

A CAFO may request to be exempted from the permit application requirement upon presenting proof that it no longer discharges into state waters except as provided above.

COASTAL ZONE NON-POINT POLLUTION CONTROL PROGRAM

On November 5, 1990, Congress enacted the Coastal Zone Act Reauthorization Amendments. Section 6217 requires a coastal zone State to develop a Coastal Zone Non-point Pollution Control Program which is supposed to be submitted, by July 19, 1995, to the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) for approval.

The program must provide for the implementation, at a minimum, of management measures in conformity with the guidance published under section 6217(g). States can use a variety of regulatory and or non-regulatory mechanisms. Non-regulatory mechanisms must be backed by enforceable state policy which ensures that the management measures will be implemented. States are expected to implement management measures within five years of the conditional or final program approval. See Appendix 2 for the following Coastal Zone Non-point Pollution Control Program, Section 6217(g) agriculture management measures:

Confined Animal Facilities (Large)
Confined Animal Facilities (Small)
Grazing
Erosion and Sediment Control
Nutrient
Pesticide
Irrigation Water

POLLUTION REDUCTION PROGRAM

The "pollution reduction program" is an enforcement program through which identified sources of water pollution are abated to levels in compliance with Federal and State regulations. It is initiated by the DOH first inspecting a livestock operation, and determining it to be a "Concentrated Animal Feeding Operation" ("CAFO"), or significant source of pollution. There are two approaches, "informal action" and "formal action", which the DOH may elect to apply in carrying out its responsibility to ensure CAFO, or other livestock industry pollution problems are properly abated.

Informal action is usually the initial approach taken by the DOH. It is termed "informal" in so far as the DOH provides the CAFO or polluter, its assisting agencies and or consultants, the freedom, within reason, to plan the necessary pollution control measures for achieving environmental goals, and the time schedule for their implementation. However, the conditions of the informal action may be followed by formal action if the CAFO or polluter elects to continue to operate with disregard to the identified pollution problem, or fails to implement necessary pollution control measures within a reasonable time schedule.

Formal action is always the last resort approach taken by the DOH. It is termed "formal" in that a formal notice is signed by the Director of Health officially notifying the CAFO or polluter of the DOH's findings of violation. It is accompanied with an order to cease and desist from any further violation, and may specify corrective measures and the time schedule for their implementation. A formal action also usually contains an order for the payment of a civil penalty. The assessed penalty takes into consideration the economic benefit gained by delaying or permanently avoiding costs necessary to achieve compliance, and a gravity component reflecting the seriousness of the violation.

APPROVAL TO CONSTRUCT AND OPERATE

The approval to construct and operate a livestock feeding or processing operation and its waste system is obtained through a plan review and approval process conducted by the DOH. The review and approval process is intended to provide the DOH an opportunity to ensure that the application of demonstrated pollution control technology, processes, and operation and maintenance practices reflects the standards of performance required by rule and that the owner of the facility is informed of and agrees to the pollution prevention plan measures under which they are allowed to operate. The DOH review and approval process is limited to matters related to pollution prevention. Other state and county agency reviews/approvals also apply.

Plan proposals may specify development phases which are scheduled for construction and operation within a five year period. The approval for development phases which are not constructed, under active construction or substantially completed before the expiration of the five year period will be automatically rescinded. The reapproval of any uncompleted

development phases will be based on the applicable rules and guidelines in effect at the time the request for reapproval is made.

If the appropriate county does not issue a building permit within twelve months after the DOH approves the construction or if the building permit is revoked or rescinded, the DOH approval to construct will be automatically rescinded. Reapproval will be based on the applicable rules and guidelines in effect at the time the request for reapproval is made.

Approval to Construct

The approval to construct a commercial livestock feeding or processing operation, and or its waste system is preceded by the owner preparing the following plan proposals:

(1) Site plan pursuant to section (A);
(2) Design plan pursuant to section (B); and
(3) Pollution prevention plan pursuant to section (C).

Submit plan proposals to the DOH, Environmental Management Division, Wastewater Branch. Plans should be of sufficient scope and depth for determining the standard of performance of the planned measures. Applicants are advised to consult with the USDA National Resource Conservation Service or a private consultant for technical assistance in preparing these plans. The University of Hawaii-Cooperative Extension Service should also be consulted for information regarding useful and practical research generated knowledge in tropical agricultural systems.

(A) Site Plan. A site plan is a site report and preliminary proposal describing the planned operation and its facilities. It contains site specific information important to the planning and design process.

Prior to the detailed design plan and pollution prevention plan development, a site plan and preliminary proposal for the planned operation should be prepared and submitted to the DOH. The DOH will provide the applicant with site specific comments. If available, the following project site information should be submitted:

(1) The name, mailing address and telephone number of the owner and manager of the site;
(2) Tax map key and total area of the livestock feeding or processing facilities, and its waste system;

(3) Weather data to include the monthly and annual average precipitation and evaporation, and 25 year 24 hour rainfall event, (see Appendix 3);

(4) Geological data to include soil types, soil depth to bedrock or highly permeable layer and ground water elevation;

(5) Site data describing and identifying on a contour plan the location of designated land use boundaries, state surface waters, agriculture and drinking water wells, roads and accesses paved or unpaved, public and private land parcels and approximate location of occupied structures, and other significant features on site or within 1500 feet of the proposed or existing facilities and waste system. Include reuse land application site location and crop system activities. The submitted information should distinguish between proposed and existing facilities;

(6) Provide color photographs of the site and surrounding landscape;

(7) Describe the type and number (average/maximum) of confined animal units, and process generated waste/waste runoff sources and their estimated volumes and strength;

(8) Describe confinement facilities, waste system (i.e., collection, transfer, treatment, storage, reuse/disposal), and pollution control measures, or other waste management options under consideration;

(9) Briefly describe operation and maintenance measures under consideration;

(10) Briefly describe planned construction and operation phases;

(11) Include proposals for variances or exceptions; and

(12) Present other relevant information, comments, special requests, or questions.

(B) **Design Plan.** Design plans are detailed scaled drawings and construction specifications identifying facilities, infrastructure, equipment layout, and pollution control measures.

Prior to the project construction, a design plan proposal should be prepared for submission to the DOH. The DOH will determine from the submitted information the

suitability of the facility, waste system, and pollution prevention measures, and provide the client with revisory comments or an approval to construct. The following project design plan information should be submitted:

(1) Provide detailed plan drawings and construction specifications. Include plan and cross sectional views with dimensions, and elevations for the waste system infrastructure, equipment layout, and implemented water pollution control measures provided. Drawings should include contoured land elevations, and distinguish between existing and proposed facilities;

(2) Describe and identify in plan the type, number (average/maximum), and location of confined animal units;

(3) Describe and identify all process generated waste and runoff sources, flow trains, flow rates, total volume, and quality based on actual or referenced data;

(4) Describe and identify overflow discharge management measures, and its off site drainage contour, receiving waters, and potential impacts;

(5) List all waste system equipment and manufacturer design applications and specifications;

(6) Identify variances or exceptions;

(7) Provide a brief description of waste system components and system operations;

(8) Identify in the plan drawings and provide the time schedules for implementing initial and subsequent construction/operation phases; and

(9) Present other relevant information, any comments, or questions.

(C) **Pollution Prevention Plan.** A pollution prevention plan basically describes the waste system operation, pollution control measures and maintenance management measures provided for the prevention of water pollution.

Prior to the project construction, a pollution prevention plan proposal should be prepared and submitted to the DOH. The DOH will determine from the submitted information the adequacy of the pollution prevention plan measures, and provide the applicant with revisory comments, or approval to construct. The following project pollution prevention plan information should be submitted:

(1) Describe the operations and maintenance management requirements for each component of the waste system (i.e., collection, transfer, treatment, storage, and disposal/removal/reuse) and pollution control measures. Include operation and maintenance methods and schedules;

(2) Identify critical site conditions, waste storage levels, and or equipment, crop system, and any second party recipients upon which the waste system operation and maintenance management is dependent; and

(3) Describe dead animal management.

Approval to Operate

Prior to the introduction of livestock, the DOH must conduct a site inspection of the completed construction or construction phase, and be satisfied that the facilities, waste systems, and pollution control measures are constructed in accordance with the approved plans and specifications. Any discrepancies should be resolved, and deviations from the plan noted and approved before initiating operations.

The approval to operate is based on the condition that the livestock operation, its waste system and pollution control measures will be operated and maintained in accordance with the approved pollution prevention plan.

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Realizing that pollution prevention measures are specific to the type of operation, its location, and management, these guidelines attempt to provide general construction, operation and maintenance management measures which do not preclude the use of demonstrated control technologies and practices which may be identified in the NRCS Agricultural Waste Management Handbook or Field Office Technical Guide, as well as other available publications. A general overview of "Components For Livestock Waste Management Systems" is provided in the Appendix 6. cost information provided by the Coastal Zone Management Program is also provided in the Appendix 7.

Site Guidelines

(A) Livestock feeding operations, and the collection, transfer, treatment and storage facilities should provide a minimum

buffer distance of 1000 feet from public drinking water resources; and 50 feet from surface water resources.

(B) Livestock waste products should not be applied to land within 150 feet from public drinking water resources; and 50 feet from surface water resources.

(C) Odor perception is a subjective human response which the DOH is required to investigate upon receiving a citizen complaint. While it may be difficult or even inappropriate to enforce odor nuisance laws on livestock facilities, the presence of heavy odors usually indicates that there may be a problem within the facility or waste system operation or maintenance practices. Owners should have a goal to construct and manage their operations and waste systems in a manner which minimizes the frequency, intensity, duration and offensiveness of the odor impact that they may have upon their neighbors.

(D) All activities must be consistent with appropriate State and County land use ordinances.

(E) Livestock facilities and waste systems should be located, if at all possible, within designated Non-Critical Wastewater Disposal Areas; over aquifers designated other than for drinking water purposes; and below the Underground Injection Control ("UIC") Line, "Pass" Zone, or Drinking Water Protection Line; see Appendices 4 and 5.

Design Guidelines

(A) Animal feeding operations shall be designed to contain all process generated waste plus the runoff from a 25 year, 24 hour rainfall event for the location of the point source, see Appendix 3. Storage provisions should also include seasonal rainfall contributions, and waste removal and reuse/disposal schedules that may be dependent on favorable weather and site conditions such as in land application and crop system practices. Rainfall runoff such as runoff that originates outside the feedlot and waste system, and roof runoff that does not contain process generated waste pollutants do not require containment and should be diverted to minimize collection and storage provisions.

(B) Waste storage structures designed to receive waste contaminated runoff, or designed to overflow during catastrophic or chronic rainfall precipitation events should

be provided with an overflow spillway and flow contour so as to provide the best overflow discharge location, flow direction, and outfall area having the least public and environmental impact.

(C) Rainfall diversion drainage and overflow discharge contours subject to scouring should be provided with soil erosion and sediment control measures.

(D) Soil surfaces serving the confined feeding operation, or the waste system collection, transfer conduit, treatment, or storage foundation for process generated waste containing drainable liquids should be of material "impervious" to liquid infiltration. The following conditions should be considered when designing and constructing a soil layer "impervious" to liquid infiltration:

(1) A compacted soil layer having a liquid discharge velocity less than 1×10^{-7} cm/sec is determined practically impervious to liquid infiltration. Assuming the soil layer will naturally seal over time, the initial discharge velocities may be allowed to exceed 1×10^{-7} cm/sec. The following considerations may apply: 1×10^{-5} cm/sec for sites below the UIC line and within the NON-CWDA, and 1×10^{-6} cm/sec for locations above the UIC line and within the CWDA will be considered on a site specific basis. The primary consideration will be the site proximity to surface and drinking water resources. The discharge velocity is determined using the Darcy's equation,

$$v = k(h/l)$$

where, v = discharge velocity
k = coefficient of permeability
h = hydraulic head
1 = soil liner thickness

As an alternative to the foregoing, existing soil permeability data may be utilized;

(2) The hydraulic gradient (h/l), should not exceed 8;

(3) The impervious soil layer should be at minimum, one foot thick;

(4) The impervious soil layer should be constructed above the ground water table; and

(5) Use of soil that may tend to shrink or crack if allowed to dry should be avoided or the soil prevented from drying.

(E) Soil surfaces serving heavy use areas such as drylots, manure storage/composting areas, or other waste system collection, transfer, treatment, or storage foundations for dry livestock waste residuals exposed to weather should be of material restrictive to liquid infiltration. The following conditions should be considered when designing and constructing a soil surface restrictive to liquid infiltration:

(1) Most of Hawaii's clay soils with proper compaction are said to provide an adequate restrictive layer. Suitable site soil should be compacted to a minimum of 90 percent of its maximum dry density at the dry optimum to optimum moisture content prior to use. Rocky or sandy soils, or soils unable to provide a reasonable restrictive surface may require amending or suitable soil imported for placement;

(2) The restrictive soil layer should be graded to prevent ponding. A two to eight percent slope is recommended; and

(3) All leachate and runoff must be collected and managed as process generated waste.

(F) Proposed facilities must be consistent with applicable building and land use ordinances.

Pollution Prevention Guidelines

(A) Animal feeding operations shall be operated to contain all process generated waste plus the runoff from a 25 year, 24 hour rainfall event for the location of the point source, see Appendix 3. The full 25 year, 24 hour rainfall storage provision should always be restored as soon as favorable weather and site conditions permit.

(B) Management of all process generated waste and runoff, including dead animals or animal parts, should be provided on a reliable basis until its final disposal, reuse, or removal and transfer to a legitimate second party recipient.

(C) Waste disposal, reuse, or transfer to second party recipients should be recorded. Records should include the date, waste volume, waste description (i.e. solid, slurry, liquid), and its destination or recipient's name. Second party recipients should be notified of applicable waste management measures.

(D) Storage structures receiving process generated waste and or rainfall runoff should be provided with a level indicator which can readily determine the volume in storage, storage volume available, minimum storage volume, and critical 25 year, 24 hour storage volume.

(E) Equipment and equipment operators capable of performing waste system operation and management tasks without damage to pollution prevention plan components should be readily available.

(F) Soil erosion and sediment control measures should be maintained on soil surfaces subject to scouring and runoff effects.

(G) Waste residues should be transported in spill proof vessels.

(H) Reuse Land application:

(1) Crop system practices should consider soil, water, nutrient, and pesticide management measures which minimize runoff and root zone leaching, (see Appendix 2);

(2) Waste effluent application methods shall not create ponding, or runoff and spray drift that exceeds the application site boundary (Federal rule);

(3) Process generated waste residues shall not be applied to land if it is likely to adversely affect human health;

(4) Dual waste effluent and potable water irrigation systems shall have approved back-flow prevention devices installed in accordance with HAR 11-21 (State rule);

(5) Waste stockpiles and reuse application areas shall not harbor or breed flies, rodents, mosquitoes or other pests (State rule);

(6) Waste residues should be incorporated into the soil profile within the crop root zone in a timely manner. Exceptions to the foregoing are pasture land or crop side-dress applications; and

(7) Crop selection and management practices should consider the risks of food chain contamination. Crop systems producing vegetables for human consumption that are ordinarily consumed raw are of greatest concern. The HAR Section §ll-11-8 provides that "it shall be unlawful to offer for sale or to sell for human consumption water-cress, lettuce, and other vegetables ordinarily eaten raw which are grown in areas subjected to contamination from water used in irrigation or from animals." The following measures may allow the beneficial reuse land application of reclaimed livestock wastes for food crop production while also sufficiently satisfying HAR Section §ll-11-8 provision:

a. Pre-planting application: Solid waste residue should be incorporated into the soil profile prior to planting. Liquid waste residues should be applied prior to crop germination; and

b. Mid-growth side-dress application: Waste residue should be treated through a "process to further reduces pathogens" prior to application, (see Appendix 7).

Waste from livestock known or likely to be infected with a transmissible human pathogen(s) should be treated through a "process to further reduce pathogens" prior to its sale, give away, or reuse application.

Abandonment Guidelines

Upon abandoning, retiring or permanently discontinuing use of a livestock production operation, the owner should render it safe and free of vectors. All waste residues should be removed and properly disposed/reused. Excavated facilities such as waste conveying ditches, separators and storage structures should be dewatered, desludged and filled completely with soil, sand, gravel or similar non-organic matter. Appropriate vegetation should be established for erosion and sediment control purposes. A notice of abandonment should be filed with the DOH. The notice should include a report of measures performed to complete the abandonment.

APPENDIX 1

CURRENT REGULATIONS

The purpose of this appendix section is to consolidate current applicable Federal and State regulations. It is inclusive for the purpose of clarifying both the regulating agency and owner/operator responsibilities which are provided to protect public health and the environment we share.

There are three levels of regulative administration which are the Code of Federal Regulation, Title 40, Protection of Environment ("40 CFR"); Hawaii Revised Statutes ("HRS"); and Hawaii Administrative Rules ("HAR"'), Title 11, Department of Health. The following provisions are presented in part for the purpose of this consolidation effort and should not be considered to be in their entirety.

40 CFR, PART 122, EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

Authority: The Clean Water Act, 33 U.S.C. 1251 et seq.

Source: 48 FR 14153, April 1, 1983

§122.23 Concentrated animal feeding operations (applicable to State NPDES programs, see § 123.25).

(a) Permit requirement. Concentrated animal feeding operations are point sources subject to the NPDES permit program.

(c) Case-by-case designation of concentrated animal feeding operations.

(1) The Director may designate any animal feeding operation as a concentrated animal feeding operation upon determining that it is a significant contributor of pollution to the waters of the United States. In making this designation the Director shall consider the following factors:

(i) The size of the animal feeding operation and the amount of wastes reaching waters of the United States;

(ii) The location of the animal feeding operation relative to waters of the United States;

(iii) The means of conveyance of animal wastes and process waste waters into waters of the United States;

(iv) The slope, vegetation, rainfall, and other factors affecting the likelihood or frequency of discharge of animal wastes and process waste waters into waters of the United States; and

(v) Other relevant factors.

(2) No animal feeding operation with less than the numbers of animals set forth in appendix B of this part shall be designated as a concentrated animal feeding operation unless:

(i) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar manmade device; or

(ii) Pollutants are discharged into waters of the United States which originate outside of the facility and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

(3) A permit application shall not be required from a concentrated animal feeding operation designated under this paragraph until the Director has conducted an on-site inspection of the operation and determined that the operation should and could be regulated under the permit program.

APPENDIX B to PART 122 - Criteria for determining a concentrated animal feeding operation (5122.23)

An animal feeding operation is a concentrated animal feeding operation for purposes of § 122.23 if either of the following criteria is met.

(a) More than 1000 animal units are confined; or

(b) More than 300 animal units are confined and either one of the following conditions are met: pollutants are discharged into navigable waters through a manmade ditch, flushing system or other similar manmade device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

Provided, however, that no animal feeding operation is a concentrated animal feeding operation as defined above if such animal feeding operation discharges only in the event of a 25 year, 24 hour storm event.

40 CFR, PART 123, STATE PROGRAM REQUIREMENTS

§123.25 Requirements for permitting.

(a) All State Programs under this part must have legal authority to implement each of the following provisions and must be administered in conformance with each. In all cases, States are not precluded from omitting or modifying any provisions to impose more stringent requirements:

(6) §122.23 - (Concentrated animal feeding operations);

(7) §122.24 - (Concentrated aquatic animal production facilities);

(8) §122.25 - (Aquaculture projects);

40 CFR, PART 144, UNDERGROUND INJECTION CONTROL PROGRAM

Authority: Safe Drinking Water Act, 42 U.S.C. 300f et seq; Resource Conservation and Recovery Act, 42 U.S.C. 6901 et seq.

Source: 48 FR 14189, April 1, 1983

§144.12 Prohibition of movement of fluid into underground sources of drinking water.

(a) No owner or operation shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. The applicant for a permit shall have the burden of showing that the requirements of this paragraph are met.

40 CFR, PART 412, FEEDLOTS POINT SOURCE CATEGORY

Authority: Sections 301, 304 (b) and (c), 306 (b) and (c) of the Federal Water Pollution Control Act, as amended: 33 U.S.C. 1251, 1311, 1314 (b) and (c), 1316 (b) and (c), and 1317 (c); 86 Stat. 816 et seq., Pub. L 92-500; 91 Stat. 1567, Pub. L. 95-217.

Source: 39 FR 5706, February 14, 1974

§412.10 Applicability; description of all subcategories except ducks. The provisions of this subpart are applicable to discharges of pollutants resulting from feedlots in the following subcategories: beef cattle - open lots; beef cattle - housed lots; dairy cattle - stall barn (with milk room); dairy - free stall barn (with milking center); dairy - cow yards (with milking center); swine - open dirt or pasture lots; swine - housed, slotted floor; swine - solid concrete floor, open or housed lot; sheep - open lots; sheep - housed lots; horses - stables (race tracks); chickens - broilers, housed; chickens - layers (egg production), housed; chickens - layers breeding or replacement stock housed; turkeys - open lots; turkeys - housed; and for those feedlot operations within these subcategories as large or larger than 1000 animal units (same definition as APPENDIX B to PART 122)

§412.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best available technology economically achievable.

(a) Subject to the provisions of paragraph (b) of this section, the following limitations establish the quantity or quality of pollutants or pollutant properties which may be discharged by a point source subject to the provisions of this subpart after application of the best available technology economically achievable. There shall be no discharge of process waste water pollutants to navigable waters.

(b) Process waste pollutants in the overflow may be discharged to navigable waters whenever rainfall events, either chronic or catastrophic, cause an overflow of process waste water from a facility designed, constructed and operated to contain all process generated waste waters plus the runoff from a 25 year, 24 hour rainfall event for the location of the point source.

HRS, CHAPTER 165, HAWAII RIGHT TO FARM ACT

§165-4 Right to farm.

(a) No court, official, public servant, or public employee shall declare any farming operation a nuisance for any reason if all of the following have been proven:
  (1) That during the twelve-month period preceding the filing of the nuisance complaint with a court or other adjudicative public body, the farming operation complied with statutes, ordinances, regulations, or rules relevant to the nuisance complaint; and
  (2) That the farming operation has used reasonable care in conducting its operation.

(b) Notwithstanding a farming operation's satisfaction of subsection (a)(l) and (2), a farming operation may be declared a nuisance if:
  (1) The farming operation or any aspect thereof has been previously determined to be injurious to public health or safety by the department of health, the department of agriculture, or a court of competent jurisdiction; and
  (2) The complainant establishes by a preponderance of the evidence that the alleged nuisance resulted from the injurious operation or aspect thereof. Any determination of injuriousness shall be in writing and shall set forth the bases for the determination.

HRS, CHAPTER 322, NUISANCES; SANITARY REGULATIONS

§322-1 Removal, prevention. The department of health and its agents shall examine into all nuisances, foul or noxious odors, gases or vapors, waters in which mosquito larvae exist, sources of filth, and all causes of sickness or disease, on shore, and in any vessel, which may be known to them or brought to their attention, which in their opinion are dangerous or injurious to health, and into any and all conditions created or existing which cause or tend to cause sickness or disease or to be dangerous or injurious to health, and shall cause the same to be abated, destroyed, removed, or prevented.

HRS, CHAPTER 340E, SAFE DRINKING WATER

§340E-2 Drinking water standards.

(e) The director shall promulgate regulations establishing an underground injection control program. Such program shall prohibit any underground injection which is not authorized by a permit issued by the director, except that the director may authorize underground injection by regulation. Underground injection authorized by regulation shall not endanger drinking water sources. Any underground injection control program shall:

(1) Set standards and prohibitions controlling any underground injection if such injection may result in the presence of any contaminant in underground water which supplies or may be expected to supply any public water system, and if the presence of such contaminant may result in such system's not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.

(2) Require, in the case of a program which authorizes underground injection by permit, that the applicant for the permit satisfy the director that the underground injection will meet the requirements of item (1) of this subsection.

(3) Include inspection, monitoring, record keeping, and reporting requirements.

§340E-7 Prohibited acts.

(f) No person shall cause a public water system to violate the state primary drinking water regulations.

(g) No person shall violate underground injection control rules adopted pursuant to this part.

(i) No person shall install or repair any public water system or any plumbing in a residential or nonresidential facility providing water for human consumption which is connected to a public water system with any pipe, solder, or flux that is not lead free. "Lead free" with respect to pipe, solder, or flux means containing not more than 0.2 per cent lead. This subsection shall not apply to leaded joints necessary for the repair of cast iron pipes.

HRS, CHAPTER 342D, WATER POLLUTION

§342D-4 Duties; rules. The director shall prevent, control, and abate water pollution in the State. The director may establish by rule, water quality standards, effluent standards, treatment and pretreatment standards, and standards of performance for specific areas and types of discharges in the control of water pollution, thereby allowing for varying local conditions.

§342D-50 Prohibition. (a) No person, including any public body, shall discharge any water pollutant into state waters, or cause or allow any water pollutant to enter state waters except as in compliance with this chapter, rules adopted pursuant to this chapter, or a permit or variance issued by the director.

(b) No person, including any public body, shall knowingly establish, extend, or alter any system of drainage, sewage, or water supply without first securing approval in writing from the director.

(c) No person, including any industrial user, shall discharge any water pollutant or effluent into a publicly owned treatment works or sewerage system in violation of:

(1) A pretreatment standard established by the department or the publicly owned treatment works; or

(2) A pretreatment condition in a permit issued by the department or a publicly owned treatment works.

§342D-51 Affirmative duty to report discharges. Any person who has caused an unlawful discharge under section 342D-50(a) has an affirmative duty to report the incident to the director within twenty-four hours of the discharge, unless a valid permit issued under section 342D-6 specifies another reporting period for the specific discharge.

HAR, TITLE 11, DOH, CHAPTER 11, SANITATION

§11-11-6 Livestock, poultry, and stables.

(a) Animal manure, refuse, etc.

(1) Every person in custody or control of any kennel, stall, stable, or place in which the manure of dogs, horses, cattle, swine, or any other animal manure, stable refuse, or any liquid discharge of such animals accumulates or originates, shall cause such manure, stable refuse or liquid, to be promptly removed there from as often as necessary, and shall keep, or cause to be kept, such stables, stalls, or places, and the drains, yards and appurtenances thereof, clean and sanitary. All such liquid and solid waste discharges shall be disposed of in a sanitary manner.

(2) No stable manure or refuse or both, while awaiting removal, shall be held for longer than twenty-four hours unless it is kept in a dung pit, refuse bin, or like storage container that is both fly-proof and rodent-proof and so constructed that objectionable odors will not emanate.

(3) No stable manure, animal or vegetable refuse, night soil, or garbage of any nature, which is dangerous to the public health, shall be used for grading or filling any lot, parcel or other tract of land except for sanitary fills approved by the director.

(b) Animal enclosures; construction, location and maintenance.

(1) All poultry houses, yards, pigeon lofts, rabbit hutches, dog kennels, pens, or enclosures for any animal shall be kept clean and free from accumulation of excreta, decayed food, and filth of every kind. The enclosures shall be kept free of rodents, fleas, lice, and other insect pests and maintained in a clean and sanitary condition. Enclosures shall be constructed as to exclude rodents and prevent the harboring of rodents. All food products, goods, wares, or merchandise on the premises which are liable, in the opinion of the director to attract or become infested with rodents, whether kept for sale or for any other purpose, shall be protected as to prevent rodents from gaining access.

(2) Floors, assorting boards, feeding troughs, gutters, and leaders shall be of material impervious to moisture so laid and graded that they may be properly flushed with water.

(3) False floors or loose boards shall not be used unless laid flush on impervious material and capable of being easily removed.

(4) Feed shall be stored only in rodent-proof boxes, bins, or rooms.

(5) Mangers shall be of single wall construction at least eighteen inches deep, and in areas where in the opinion of the director there is danger of the existence of plague or typhus, shall be kept free from food except when the animal is feeding.

(6) Lofts and coops housing pigeons raised for domestic use or for commercial purposes shall comply with all spacing and zoning requirements, and county codes and ordinances. All enclosures shall be maintained in a clean and sanitary condition and kept in good repair.

(c) Disposal of dead animals: Animal carcasses and organs affected with diseases transmissible or possibly transmissible to humans or animals, and carcasses of animals that die before slaughter, shall be destroyed and not used for feeding of any animal.

§11-11-7 Garbage and swill.

(a) On premises; removal of

(1) No person shall have on his premises any offal, swill, garbage, decayed meat, fish, animal or vegetable matter, whether solid or liquid except as herein provided.

(2) The person, firm, or corporation occupying any premises upon-which garbage and rubbish containing food wastes are created shall place all such garbage and rubbish containing food wastes in a water-tight receptacle of metal or other impervious material. Receptacles shall be kept closed by a tight-fitting cover, except while being filled or emptied. The casting aside or throwing about of unconsumed food, rubbish containing food wastes or of any garbage anywhere in the State is prohibited.

(b) Transportation of

(1) No person shall transport on any street any offal, swill, garbage, decayed meat, fish, animal or vegetable matter, whether solid or liquid, unless the same shall be in water-tight containers with tight-fitting covers. The operator of every vehicle or vessel used to transport another types of offensive refuse in bulk form shall cover said refuse.

(2) Vehicles used for conveying offal; swill, or other offensive substances, shall not be used in the

conveyance of any other food items which are to be sold for human consumption.

(c) Boiling or other treatment. All garbage, offal, and swill, regardless of previous processing, shall, before being fed to any animal, be thoroughly boiled for at least thirty minutes and then slowly cooled so that every part shall have been at the boiling point of water for at least thirty minutes, unless treated in a manner which shall be approved in writing by the director as being as effective as such boiling and cooling in protecting the public health.

§11-11-8 Vegetables.

(c) Vegetables, raw. It shall be unlawful to offer for sale or to sell for human consumption water-cress, lettuce, and other vegetables ordinarily eaten raw which are grown in areas subjected to contamination from water used in irrigation or from animals.

HAR, TITLE 11, DOH, CHAPTER 21, CROSS-CONNECTION AND BACK-FLOW CONTROL

§11-21-7 Irrigation systems.

(a) The following guidelines relating to back-flow prevention devices for irrigation systems shall apply:

(1) Atmospheric vacuum breakers shall be installed after the last control valve of each sprinkler circuit and at a minimum of six inches above the highest irrigation head. The atmospheric vacuum breaker shall be installed only on irrigation circuits with heads that will not return any pressures in the circuit when the circuit control valve is closed.

(2) Pressure vacuum breakers shall be installed at the beginning of each irrigation circuit and at a minimum of twelve inches above the highest irrigation head on the circuit. Individual irrigation circuits having quick coupling valves or other similar type heads that will permit pressure to be retained in the circuit shall have a pressure vacuum breaker installed as a minimum requirement for each circuit. Irrigation systems using the subsurface drip method shall have a pressure vacuum breaker on each circuit. A pressure vacuum breaker may not be installed where a double check valve assembly, reduced pressure principle back-flow prevention device, or air gap separation is required.

(3) A double check valve assembly may be installed to serve multiple irrigation circuits in lieu of vacuum breakers on each individual irrigation circuit.

(4) A reduced pressure principal back-flow preventer or air gap separation shall be required before any piping network in which fertilizers, pesticides and other chemicals or toxic contaminants are injected or

siphoned into the irrigation system. [Eff. December 26, 1981] (Auth: HRS §§340E-2, 340E-9) (Imp: HRS §§340E-2, 340E-9)

§11-21-8 Maintenance requirements.

(a) It shall be the responsibility of water users to maintain all back-flow preventers and vacuum breakers within the building or on the premises in good working order. No piping or other arrangement for the purpose of bypassing back-flow devices shall be permitted.

(b) Periodic testing and inspection schedule shall be established by the director for all back-flow preventers in intervals between such testing, inspection and overhauls of each devices shall be established in accordance with age and condition of the back-flow prevention device. Inspection intervals should not exceed one year. Back-flow prevention devices should be inspected frequently after initial installation to assure that the devices are properly installed and debris resulting from the installation has not interfered with the functioning of the device. The inspection and testing shall be performed by a certified tester approved by the director. In those instances where the director deems the hazard to be great, inspections may be required at more frequent intervals. Records of any tests, repairs and overhauls shall be kept and made on forms prescribed by the director. Should the water user fail to make the proper test and provide all records on the test, the director at his discretion may perform the necessary test, needed repairs, and replacements and charge the cost thereof to the water consumer [Eff December 26, 1981] (Auth: HRS §§340E-2, 340E-9) (Imp: HRS §§340E-2, 340E-9)

HAR, TITLE 11, DOH, CHAPTER 23, UNDERGROUND INJECTION CONTROL

§11-23-04 Classification of exempted aquifers and underground sources of drinking water.

(a) Upon request, and with concurrence of the director, the department shall review the aquifer designations. The aquifer designations shall be reviewed at least every three years. In its review, the department may amend the status of an aquifer in accordance with Chapter 91, HRS. The criteria for exempting aquifers from underground sources of drinking water (USDW) status are as follows:

(1) The aquifer does not currently serve as a source of drinking water; and

(2) The aquifer cannot now and will not in the future serve as a source of drinking water because of any of the following criteria:

(A) It is situated at a depth or location which currently makes recovery of water for drinking water purposes economically or technologically impractical; or

(B) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or

(C) The total dissolved solids (TDS) concentration of the ground water is more than five thousand mg/L, and it is not reasonably expected to supply a public or private drinking water system.

(b) The UIC maps shall indicate exempted aquifers and USDW in plan view, by use of the UIC line, and such maps are an integral part of this chapter. The department's UIC maps shall be the final authority for the identification of the aquifer boundaries on the land surface. Copies of the maps and this chapter are available for examination at an office of the department's environmental protection and health services division, the district health offices and other department offices on each island.

(c) Unless expressly exempted, all aquifers are considered to be USDW.

§11-23-05 Identification of exempted aquifers and USDW.

(a) The department has designated the following formations as exempted portions of aquifers: in the horizontal dimension, lands which are makai of the UIC line; and in the vertical dimension:

(1) Where the volcanic formation is a non-artesian aquifer, the entire geologic column; or

(2) Where the volcanic formation is an artesian aquifer, from the subaerial ground surface down to fifty feet above the contact between the artesian volcanic aquifer and the overlying confining materials.

(b) Unless an aquifer is expressly exempted, as described above or depicted on the department-issued UIC maps, it is an USDW.

(c) In areas where the UIC line is defined by a roadway, a setback of one lot or one hundred fifty feet, whichever is less, from the mauka property line of that roadway may be considered to be within the exempted area. If the roadway is within a property, the setback shall extend to the mauka property line or to one hundred fifty feet from the mauka edge of said roadway, whichever is less. This interpretation of the UIC line shall be subject to all other conditions of this chapter. The applicant, on the permit application, shall request this interpretation, approval of which shall be based on the proximity and sensitivity of drinking water sources.

HAR, TITLE 11, DOH, CHAPTER 26, VECTOR CONTROL

§11-26-11 Flies; protection against breeding. No person, firm, or corporation shall have or keep upon premises owned, leased, or occupied by them, any article, substance or thing of whatever kind, nature, or description in which flies may breed, unless the

same be kept protected from flies or maintained in a manner consistent with pest management methods.

§11-26-12 Flies; management of farm animal wastes. Every owner, or operator of a farm on which animals or fowls are kept shall manage wet manure, liquid or solid waste, refuse, and other putrescible wastes in which flies may breed in a manner which inhibits fly breeding as prescribed by pest management methods.

§11-26-13 Flies; reuse of animal farm waste.

(a) No person, firm, or corporation shall use untreated animal waste for soil enrichment unless the same waste is managed to prevent fly breeding by an approved pest management method.

(b) No animal or poultry farm waste, vegetable refuse, night soil, or garbage of any nature, which is dangerous to the public health, shall be used for grading or filling any lot, parcel, or other tract of land except for sanitary landfills approved by the director.

§11-26-22 Mosquitoes; protection against breeding. As used in this subchapter "mosquitoes" include mosquitoes, midges, and gnats. It shall be unlawful to have, keep, maintain, cause, or permit any collection or standing or flowing water:

(1) In which mosquitoes propagate; or

(2) In which mosquitoes may propagate unless such water is treated or managed to prevent breeding.

§11-26-31 Rodents; construction of new buildings.

(a) Buildings intended for restaurants, markets, stables, slaughterhouses, piers, theaters, and storehouses for foodstuffs shall have the floor of the lower story constructed of concrete or other material impervious to rodents.

(b) Residences and other buildings not having the floor of the lower story of concrete or other material impervious to rodents shall have an unobstructed crawl space of at least twenty inches between the bottom of the joists of the lower floor of the building and the highest point of ground. Such space shall not be secured by excavation, except when authorized by the director in cases where proper drainage, ventilation, and access can be secured.

(c) All parts of all buildings shall be rat-proof.

§11-26-32 Rodents; repair and maintenance of existing buildings.

(a) Buildings which do not have the floor of the lower story of material impervious to rodents, shall be altered so as to conform to the requirements in §11-26-31 of these rules. Buildings with floors of wood or other material pervious to rodents shall not be used for the storage of foodstuff unless a separate room or enclosure is provided for storage. Such storage shall be completely lined with hardware cloth with openings not larger than one-quarter inch or other material equally impervious to rodents and protected from rodent excrement.

(b) Buildings, sidewalks, and retaining walls shall be maintained to exclude rodents and prevent the harboring of rodents.

(c) No person shall remove or alter the existing rat-proofing of any building, or make any new openings that are not closed or sealed against the entrance of rodents.

§11-26-33 Rodents; control on premises. Every owner or occupant of any premises that has rodents shall promptly eradicate or in good faith continually endeavor to eradicate the rodents by poisoning, trapping, or by other appropriate means. Foodstuffs, animal feed and other edible materials upon which rodents may feed shall be kept in rat-proof structures and locations inaccessible to rodents. Windfalls, garbage, and other materials which may serve as food for rodents shall be removed promptly and stored in rat-proof containers for proper removal and disposal.

§11-26-34 Rodents; rubbish and loose materials.

(a) No rubbish of any description shall be placed, left, dumped or permitted to be stored in the vicinity of any building in such a manner as to afford a harboring or breeding place for rodents.

(b) Indiscriminate dumping of rubbish or waste is prohibited.

(c) Firewood, scrap lumber, and other loose usable materials on any premises shall be orderly piled on platforms or stands with sufficient clearance to prevent rat harborage and also to facilitate inspection and cleaning.

§11-26-35 Rodents; demolishing of structure and clearing of sites and vacant lots.

(a) No person, firm, or corporation shall demolish or clear any structure, site, or vacant lot without first ascertaining the presence or absence of rodents which may endanger the public health by dispersal from such premises.

(b) Should such inspection reveal the presence of rodents, the person, firm, or corporation shall eradicate the rodents before demolishing or clearing the structure, site, or vacant lot.

(c) The department may conduct an independent inspection to monitor compliance, or request a written report.

(d) Vacant lots and ground not built upon shall be kept free of harborage.

§11-26-61 Fleas, mites and ticks. Premises shall be kept free from fleas, mites, and ticks to prevent occurrence of a public health disease or nuisance.

§11-26-62 Cockroaches. Premises shall be kept reasonably free of cockroach infestation to prevent hazards to public health, welfare, and comfort.

§11-26-63 Venomous arthropods.

(a) As used in this section "venomous arthropods" mean those animals that can inflict injurious or fatal bites or stings to humans and include centipedes, scorpions, spiders, ants, bees, and wasps.

(b) Premises shall be kept reasonably free of venomous arthropod infestations to prevent hazards to public health, welfare, and comfort.

HAR, TITLE 11, DOH, CHAPTER 54, WATER QUALITY STANDARDS

§11-54-01.1 General policy of water quality anti-degradation. Waters whose quality are higher than established water quality standards shall not be lowered in quality unless it has been affirmatively demonstrated to the director that the change is justifiable as a result of important economic or social development and will not interfere with or become injurious to any assigned uses made of, or presently in, those waters.

HAR, TITLE 11, DOH, CHAPTER 55, WATER POLLUTION CONTROL

§11-55-02 General policy of water pollution control.

(a) It is the public policy of this State:
  (1) To conserve state waters;
  (2) To protect, maintain, and improve the quality of state waters:
    (A) For drinking water supply, and food processing;
    (B) For the growth, support and propagation of shellfish, fish and other desirable species of marine and aquatic life;
    (C) For oceanographic research;
    (D) For the conservation of coral reefs and wilderness areas; and
    (E) For domestic, agricultural, industrial, other legitimate uses.
  (3) To provide that no waste be discharged into any state waters without first being given the degree of treatment necessary to protect the legitimate beneficial uses of such waters;
  (4) To provide for the prevention, abatement, and control of new and existing water pollution; and
  (5) To cooperate with the federal government in carrying out these objectives.

(b) Any industrial, public, or private project or development which could constitute a new source of pollution or an increased source of pollution shall, in its initial project design and subsequent construction, provide the highest and best degree of waste treatment practicable under existing technology.

(c) Permits issued under this chapter, and the related applications, processing, issuance, and post-issuance procedures and requirements, shall be at least as stringent as those required by 40 CFR §123.25(a).

§11-55-04 Application for NPDES permit.

(a) Before discharging any pollutant, or substantially altering the quality of any discharges, or substantially increasing the quantity of any discharge, a person shall file a

complete NPDES application (which shall include a BMP program if necessary under 40 CFR §125.102) or submit a complete notice of intent. Submissions of notice of intent shall comply with and be regulated by §§11-55-34.08 through 11-55-34.1

HAR, TITLE 11, DOH, CHAPTER 58.1, SOLID WASTE MANAGEMENT CONTROL

§11-58.01-04(i) Permit by rule for certain solid waste handling and disposal facilities of limited impact.

(1) Permit by rule: Notwithstanding any other provisions of these rules, the convenience centers, cornposting facilities handling not more than three thousand tons per year of green wastes, clearing and grubbing landfills, certain agriculture landfills, and recycling drop-off facilities shall be deemed to have a solid waste handling and disposal permit if the following conditions are met:

(A) Notification. At least thirty days prior to commencing solid waste handling activities which are covered under a permit by rule, written notification of such activity must be made to the director. Written notification shall be made on such forms as are provided by the director. Persons failing to notify the director of such activities shall be deemed to be operating without a permit.

(B) General conditions of every facility.

(i) No regulated hazardous waste in accordance with 40 CFR Part 261 may be collected, transported, or disposed at any of the facilities.

(ii) Nuisance control. Suitable means shall be employed to prevent solid wastes from scattering; control of litter, odors and vectors such as rodents and insects.

(iii) Suitable means shall be provided to prevent and control fires, including emergency response plan when appropriate.

(iv) It is the responsibility of the owner and/or operator to comply with all the local rules, regulations, and ordinances, and the director may add additional conditions deemed appropriate.

(v) Each facility shall be supervised, secured, and have a permanent sign identifying the facility, hours and days of operation, materials accepted or not accepted, the owner and/or operator, a person to contact, and other pertinent information.

(vi) An annual report shall be prepared and submitted to the director.

(D) Green wastes (landscape waste) composting facilities.

(i) Cornposting facilities accepting only green waste, less than three thousand tons per year, are permitted by rule unless exempted.

(ii) The finished compost must be sufficiently stable that it can be stored or applied on land without producing a nuisance.

(iii) An annual report shall be prepared and submitted to the department, reporting the tonnage of green waste accepted, the composted tonnage produced, and residual disposed.

(iv) The department reserves the right to add additional requirements.

(E) Land clearing, grubbing, and certain agricultural landfills and inert waste landfills.

(i) All persons exempted under section 11-58.1-4(b) (3) and land-filling more than one hundred and fifty tons per year shall be permitted by rule.

(ii) Only waste that will not or is not likely to produce leachate of environmental concerns shall be disposed of in the landfill. Acceptable materials for disposal in the land clearing, grubbing, and certain agricultural landfill are earth and earth-like products, and land clearing debris such as stumps, limbs and leaves. Acceptable materials for disposal in the inert waste landfill are earth and earth-like products, concrete, cured asphalt, rocks, and bricks.

(iii) Materials placed in the landfill shall be generated on site and spread in layers and compacted to the smallest practicable volume.

(iv) Public access to the landfills shall be limited to authorized entrances which shall be closed when the site is not in operation.

(v) The final cover shall consist of eighteen inches of earthen material to minimize infiltration and six inches of earthen material to minimize erosion or as approved by the director. A vegetative cover shall be placed over the final lift, not later than one month following final placement of waste within that lift. The vegetative cover must be maintained a minimum of a year after the closure of the landfill.

(vi) A written notice of final closure must be provided to the director within one hundred eighty days of receiving the final load of material. An site not receiving waste for in excess of one hundred eighty days shall be deemed abandoned and in violation of these rules unless properly closed. Notice of closure must include the date of final material receipt and an accurate legal description of the boundaries of the landfill.

(vii) A permanent notation of the landfill location shall be added at the bureau of conveyances to the facility property and on any other instrument that would normally be examined during the title search and note any land use restrictions from the closure plans. The notation shall notify any potential purchaser of the property that the area has been used for land clearing and grubbing and agricultural solid waste landfills.

(viii) All other applicable federal, state, and local laws, rules, and ordinances, including erosion and sediment control, and any applicable federal wetlands permits, must be fully complied with prior to commencement of land-filling operations.

§11-58.1-41 Cornposting facilities.

(a) Applicability. This section regulates the construction and operation of cornposting facilities for sewage sludge, green waste (yard waste), and other solid wastes.

(A) Exemption. Cornposting facilities processing less than three thousand tons of green wastes per year are permitted by rule.

(b) Permit requirements:

(1) Site analysis. A site analysis shall be submitted and shall included at least a site plan, description of the siting of equipment and machinery, public access, and turnaround areas. The site analysis shall include surrounding land uses and, where determined necessary by the director, describe mitigative measures taken to reduce the impact of the facility upon neighboring properties.

(2) Design requirements/

(A) Provide engineering plans and specifications for the entire cornposting facility, including manufacturer's performance data for the selected equipment.

(B) The composting facility must have sufficient temperature monitoring to ensure that the pathogen

reduction criteria are met. For a windrow and an aerated static pile process, this may include monitoring six to eight inches below the pile surface and for an aerated static pile process, six to eight inches from the outlet of the aeration pipe. For an enclosed vessel system, this may include monitoring six to eight inches inside the vessel wall and six to eight inches from the aeration piping (when operating in the positive aeration mode). Temperature monitoring must occur, at a minimum, on a daily basis.

(C) Nuisance, health, and safety control. Design methods to control litter, insects, odors, and vectors. Develop a fire plan to prevent and minimize fire hazards. The transfer station shall maintain a neat and orderly appearance and must be screened and buffered to minimize nuisances to neighboring properties.

(D) The waste storage area and the active cornposting, curing, and compost storage areas must be located on surfaces capable of minimizing leachate release into the ground water under the site and the surrounding land surface.

(E) All leachate must be collected and treated by a method (in the engineering report) approved by the department.

(G) Adequate drainage. Adequate drainage to prevent standing water and to control "run-on" and "run-off" of rainwater shall be provided.

(3) Operation plan.

(A) Provide a description of the type and size of the facility, detention times for handling and processing the material, a process flow diagram of the entire process, and all the major equipment required. Include in the report monitoring information, such as the locations of all the temperature monitoring points and their frequency of reading.

(B) Provide a detailed description of the source, quality and quantity of the solid waste to be composted, including the source, quality, and expected quantity of any bulking agent to be used.

(C) The compost from cornposting operations shall be nonpathogenic, free of offensive odors, biologically and chemically stable, and free of injurious components or particles, and able to sustain plant growth. Rejects generated by the cornposting process shall be disposed of in accordance with these rules.

(D) Solid waste that possess a pathogen concern, shall be composted and meet the criteria for reducing pathogens. Three acceptable methods are:

(i) Using the windrow cornposting method, the solid waste is maintained under aerobic conditions during the cornposting process. A minimum of five turnings is required during a period of fifteen consecutive days with the temperature of the mixture being fifty-five degrees Celsius or greater within six to eight inches below the surface of the pile.

(ii) Using the aerated static pile composting method, the compost pile must be insulated and a temperature of not less than fifty-five degrees Celsius or greater must be maintained throughout the compost pile for at least three consecutive days.

(iii) Using the enclosed vessel cornposting method, the mixture must be maintained at a temperature of not less than fifty-five degrees Celsius or greater throughout the mixture for at least three consecutive days.

(iv) Other methods may be submitted to the director and they will be approved on a case-by-case basis. .

E. Provide a description of the ultimate use for the finished compost and the method of removal from the site. Include a plan for disposal of the finished compost that cannot be used.

4. Closure plan. As part of the application for a permit, the owner and/or operator shall develop a closure plan to ensure no adverse environmental impacts.

(c) Reporting requirements. At a minimum, an annual report shall be submitted to the department, not later than thirty days after June 30 of each year. The report must include:

(A) The type and quantity, by weight or volume after primary processing, of solid waste received by the facility.

(B) The quantity, by weight or volume, of compost produced and removed from the facility.

(C) A summary of monitoring done during the operation.

HAR, TITLE 11, DOH, CHAPTER 62, WASTEWATER SYSTEMS

§11-62-05 Critical wastewater disposal areas.

(a) On a county-by-county basis, the director may establish critical wastewater disposal areas based on one or more of the following concerns:

(1) High water table;

(2) Impermeable soil or rock formation;

(3) Steep terrain;

(4) Flood zone;
(5) Protection of coastal waters and inland surface waters;
(6) High rate of cesspool failures; and
(7) Protection of groundwater resources.

(b) The director may impose more stringent requirements than those specified in these rules for proposed wastewater systems located within any designated critical wastewater disposal area. Requirements that the director may impose include, but are not limited to, meeting higher effluent standards for wastewater systems, limiting the method of effluent disposal and requiring flow restriction devices on water fixtures.

(c) Proposed cesspools shall be severely restricted or prohibited in any designated critical wastewater disposal area.

§11-62-06 General requirements.

(d) Buildings generating non-domestic wastewater shall meet the specific requirements of this chapter as determined to be applicable by the director. Wherever applicable, the director shall use the effluent requirements for non-domestic wastewater as set forth by the EPA. Construction plans and engineering reports for proposed non-domestic wastewater systems shall be sufficient in scope and depth for determining the adequacy of compliance with the provisions of section 11-62-02.

(e) Any building or facility which is located within the state agricultural land use district, county agricultural zoned districts or conservation districts may be exempt from the provisions of subchapters 2 and 3, provided that such building or facilities are essential to the operation of an agricultural enterprise or are consistent with the conservation district use intent. However, the owner shall submit for the director's approval plans or engineering reports or both for the wastewater systems proposed to accommodate the wastewater generated from any building or facility in the category. Such information submitted shall be sufficient in scope and depth for determining the adequacy of performance of the wastewater system in meeting the provisions of section 11-62-02.

(f) A holding tank except for public facilities in areas where the subsurface disposal of wastewater is prohibited or privy shall not be considered as an acceptable wastewater system.

(g) No person or owner shall cause or allow any wastewater system to create or contribute to any of the following:
(1) Human illness;
(2) Public health and safety hazard;
(3) Nuisance;
(4) Unsanitary condition;
(5) Wastewater spill, overflow or discharge onto the ground or into surface waters;

(6) Contamination, or pollution of state surface waters;
(7) Harborage of vectors, including insects and rodents.
(8) Foul or noxious odors;
(9) Public safety hazard; and
(10) Contamination, pollution or endangerment of drinking waters.

If any of the foregoing conditions exist, the owner shall immediately notify the director.

(h) In case of a violation of this chapter, the director shall initiate enforcement action against the owner(s) of the wastewater system and initiate enforcement action against other persons to have the offending condition abated, corrected, resolved, destroyed or prevented. In addition, once a violation of this chapter occurs, the director shall order the owner of the wastewater system to take immediate actions to protect public health and safety.

(i) Upon request by the director, proposed wastewater systems in critical wastewater disposal areas shall be approved in writing or by rule by the respective county board of water supply or department of water supply.

(j) The construction of any wastewater system involving the subsurface disposal of wastewater shall be in compliance with applicable provisions of chapter 11-23.

(k) If the appropriate county does not issue a building permit for a private building within twelve months after the director approves the construction of a wastewater system to serve the building or if the appropriate county revokes or rescinds a building permit and the building is to be served by a wastewater system, the director's approval to construct the wastewater system is automatically rescinded unless a request for an extension is made thirty days before the expiration of the twelve month period. One extension of six months may be approved by the director. Reapproval of any wastewater system for which the director's approval has been rescinded pursuant to this paragraph shall be based on the applicable rules in effect at the time the request for reapproval is made.

(l) Whenever a building modification is proposed, the wastewater system serving the building shall be required to meet the applicable requirements of this rule if:
(1) The existing wastewater system has created or contributed to any of the conditions noted in subsection (g);
(3) The existing wastewater system disposes untreated wastewater directly into the groundwater table.

11-62-07 Wastewater sludge disposal. (a) This section describes the acceptable disposal methods for wastewater sludge. The director shall approve each wastewater sludge disposal plan including the necessary treatment and transportation of the

sludge. The plan shall specify the manner of sludge disposal to be used pursuant to subsection (c).

(b) No person shall place or dispose of wastewater sludge into pits, subsurface disposal systems, state waters, or onto the ground except as provided by subsection (c).

(c) Wastewater sludge shall only be disposed of in the following manner:

(1) By a private, county, or state solid waste disposal facility which has a permit pursuant to chapter 11-58, to accept wastewater sludge;

(2) By reclamation or reuse for agricultural purposes as set forth by EPA regulations;

(3) By incineration which meets all applicable requirements of chapter 11-60; or

(4) By a private, county, or state wastewater system which has been given specific written authorization to accept and dispose of sludge.

11-62-08 Specific requirements for wastewater systems.

(a) Intent.

(1) It is the intent of this section and subchapters 2 and 3 to set forth minimum requirements for the following purposes:

(A) To clarify responsibilities of owners, engineers and the department;

(B) To set minimum distance requirements so that minor nuisances are avoided;

(C) To set the minimum requirements to protect public health, safety, and welfare, and to protect the wastewater systems from malicious damage or unauthorized entry; and

(D) To emphasize the need for proper installation, operation and maintenance.

(b) No person shall construct or expand a wastewater system without the approval of the director. The following documents shall be submitted to the director prior to such approval:

(1) Construction plans prepared by or under the supervision of an engineer indicating the following:

(A) Acreage and tax map key number(s) of the project site;

(B) Plot plan drawn to scale showing the location of the proposed and any existing wastewater system and its distances from existing and proposed buildings, structures, legal boundaries, property lines, adjacent surface bodies of water, drinking water sources and existing public sewers within 2,000 feet of the nearest property line; and

(C) Sufficient details to show compliance with all applicable requirements of this chapter.

(2) Sludge disposal plan prepared in accordance to section 11-62-07.

(d) Measures to control public accessibility to proposed and existing treatment units shall be provided to prevent accidents, drownings, vandalism and interference with the treatment process. At a minimum, the provisions shall include:

(1) Fencing or other secured enclosures at least six feet in height for treatment units with exposed water surfaces or equipment; or

(2) Completely enclosed treatment units with unexposed water surfaces and equipment. Access opening to completely enclosed treatment units(s) and equipment shall be secured and properly identified, and be large enough to remove equipment from the facility.

(e) No person shall use the area adjacent to or directly above proposed and existing wastewater systems for purposes or activities which may hinder or interfere with the operation and maintenance of the wastewater system.

(f) No person shall operate a wastewater system unless that person or the owner of the wastewater system is authorized by the director in accordance with the applicable provisions of sections 11-62-23.1(e) and 11-62-31.1(f) and the applicable provisions of chapter 11-61, Mandatory certification of operating personnel in wastewater treatment facilities.

(g) All wastewater systems shall be constructed or expanded by a person meeting the requirements of section 444, HRS and any pertinent rules promulgated by the Department of Commerce and Consumer Affairs, State of Hawaii.

§11-62-31.1 General requirements for proposed individual wastewater systems.

(f) No person shall operate an individual wastewater system until authorized in writing by the director.

(1) Written approval by the director shall be issued if, upon inspection of the installed individual wastewater system and before being back-filled, the system complies with these rules and the approved plans and specifications.

(A) Before operation of the system the owner shall resolve all discrepancies recorded as a result of the inspections conducted.

(B) Any changes to the approved plans and specifications shall be submitted to the director for approval before final inspection.

(2) If the inspection is waived by the director, the engineer or contractor shall furnish a written statement to the director within 30 days after the completion of the construction certifying that the individual wastewater system was installed in

accordance with the approved plans and specifications. Any deviations shall be noted and approved by the director before the individual wastewater system can initiate operation.

APPENDIX 2

COASTAL ZONE NON-POINT POLLUTION CONTROL PROGRAM MANAGEMENT MEASURES FOR AGRICULTURE

Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large Units)

A. Storing both the facility wastewater and the runoff from confined animal facilities that is caused by storms up to and including a 25 year, 24 hour frequency storm. Storage structure should:
   1. Have an earthen lining or plastic membrane lining,
   2. Be constructed with concrete, or
   3. Be a storage tank;

B. Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

Applicability: This management measure is intended for application by States to all new facilities regardless of size and to all new or existing confined animal facilities that contain the following number of head or more:

	Head	Animal Units
Beef Feedlots	300	300
Dairies	70	98
Swine	200	80
Broilers/Layers	15,000	150[1]
		495[2]

[1] **Liquid manure systems**

[2] **Continuous overflow watering**

Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units)

A. Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25 year, 24 hour frequency storm. Implement these systems to substantially reduce significant increases in pollutant loadings to ground water.

B. Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

Applicability: This management measure is intended for application by States to all existing confined animal facilities that contain the following number of head:

	Head	Animal Units
Beef Feedlots	50 - 299	50 - 299
Dairies	20 - 69	28 - 97
Swine	100 - 199	40 - 79

Broilers/Layers	5,000 - 14,999	50 - 149[1] 165 - 494[2]

[1] Liquid manure systems
[2] Continuous overflow watering

Grazing Management Measure

Protect range, pasture and other grazing lands:

A By implementing one or more of the following to protect sensitive areas (such as stream banks, wetlands, estuaries, ponds, lake shores, and riparian zones) to reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock:
   1. Exclude livestock;
   2. Provide stream crossings or hardened watering access for drinking;
   3. Provide alternative drinking water locations;
   4. Locate salt and additional shade, if needed, away from sensitive areas; or
   5. Use improved grazing management (e.g., herding)

B. By achieving either of the following on all range, pasture, and other grazing lands not addressed under 1:
   1. Implement the range and pasture components of a Conservation Management System as defined in the Field Office Technical Guide of the USDA-SCS by applying the progressive planning approach of the USDA-SCS to reduce erosion; or
   2. Maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of the USDA.

Applicability: The management measure is intended to be applied by States to activities on range, irrigated and non-irrigated pasture, and other grazing lands used by domestic livestock.

Erosion and Sediment Control

A. Apply the erosion component of a Conservation Management System as defined in the Field Office Technical Guide of the USDA-SCS to minimize the delivery of sediment from agricultural lands to surface waters, or

B. Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10 year, 24 hour frequency.

Applicability: This management measure is intended to be applied by States to activities that cause erosion on agricultural land and on land that is converted from other land uses to agricultural lands. agricultural lands include: cropland;

irrigated cropland; range and pasture; orchards; permanent hayland; specialty crop production; and nursery crop production.

Nutrient Management Measure

Develop, implement, and periodically update a nutrient management plan to:

A. Apply nutrients at rates necessary to achieve realistic crop yields;
B. Improve the timing of nutrient application; and
C. Use agronomic crop production technology to increase nutrient use efficiency

When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely. Nutrient management plans contain the following core components:

A. Farm and field maps showing acreage, crops, soils, and water bodies;
B. Realistic yield expectations for the crop(s) to be grown, based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or SCS Soils-5 information for the soil series;
C. A summary of the nutrient resources available to the producer, which at a minimum include:
    1. Soil test results for pH, nitrogen, phosphorus, and potassium;
    2. Nutrient analysis of manure, sludge, mortality compost (birds, pigs,-etc.), or effluent;
    3. Nitrogen contribution to the soil from legumes grown in the rotation; and
    4. Other significant nutrient sources (i.e. irrigation water);
D. An evaluation of field limitations based on environmental hazards or concerns, such as:
    1. Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential;
    2. Lands near surface water;
    3. Highly erodible soils; and
    4. Shallow aquifers;
E. Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation;
F. Identification of timing and application methods for nutrients to:
    1. Provide nutrients at rates necessary to achieve realistic crop yields;
    2. Reduce losses to the environment; and
    3. Avoid applications as much as possible during periods of leaching or runoff potential.

G. Provisions for the proper calibration and operation of nutrient application equipment.

Applicability: This management measure is intended to be applied by States to activities with the application of nutrients to agricultural lands. Agricultural lands include: Cropland; Irrigated cropland; Range and pasture; Orchards; Permanent hayland; Specialty crop production; and Nursery crop production.

Pesticide Management Measure

To reduce contamination of surface water and ground water from pesticides:

A. Evaluate the pest problems, previous pest control measures, and cropping history;

B. Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination;

C. Use integrated pest management strategies that:
   1. Apply pesticides only when an economic benefit to the producer will be achieved (i.e. applications based on economic thresholds); and
   2. Apply pesticides efficiently and at times when runoff losses are unlikely;

D. When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff and leaching potential of products in making a selection;

E. Periodically calibrate pesticide spray equipment; and

F. Use anti-back-flow devices on hoses used for filling tank mixtures.

Applicability: This management measure is intended to be applied by States to activities with the application of pesticides to agricultural lands. Agricultural lands include: Cropland; Irrigated cropland; Range and pasture; Orchards; Permanent hayland; Specialty crop production; and Nursery crop production.

Irrigation Water Management

To reduce non-point source pollution of surface waters caused by irrigation:

A. Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as minimum:
   1. The accurate measurement of soil-water depletion volume and volume of irrigation water applied; and
   2. Uniform application of water.

B. When chemigation is used, include back-flow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with

furrow irrigation systems, a tail water management system may be needed;

The following limitations and special conditions apply:

A. In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. in these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations;

B. By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure;

C. In some irrigation districts, the time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible;

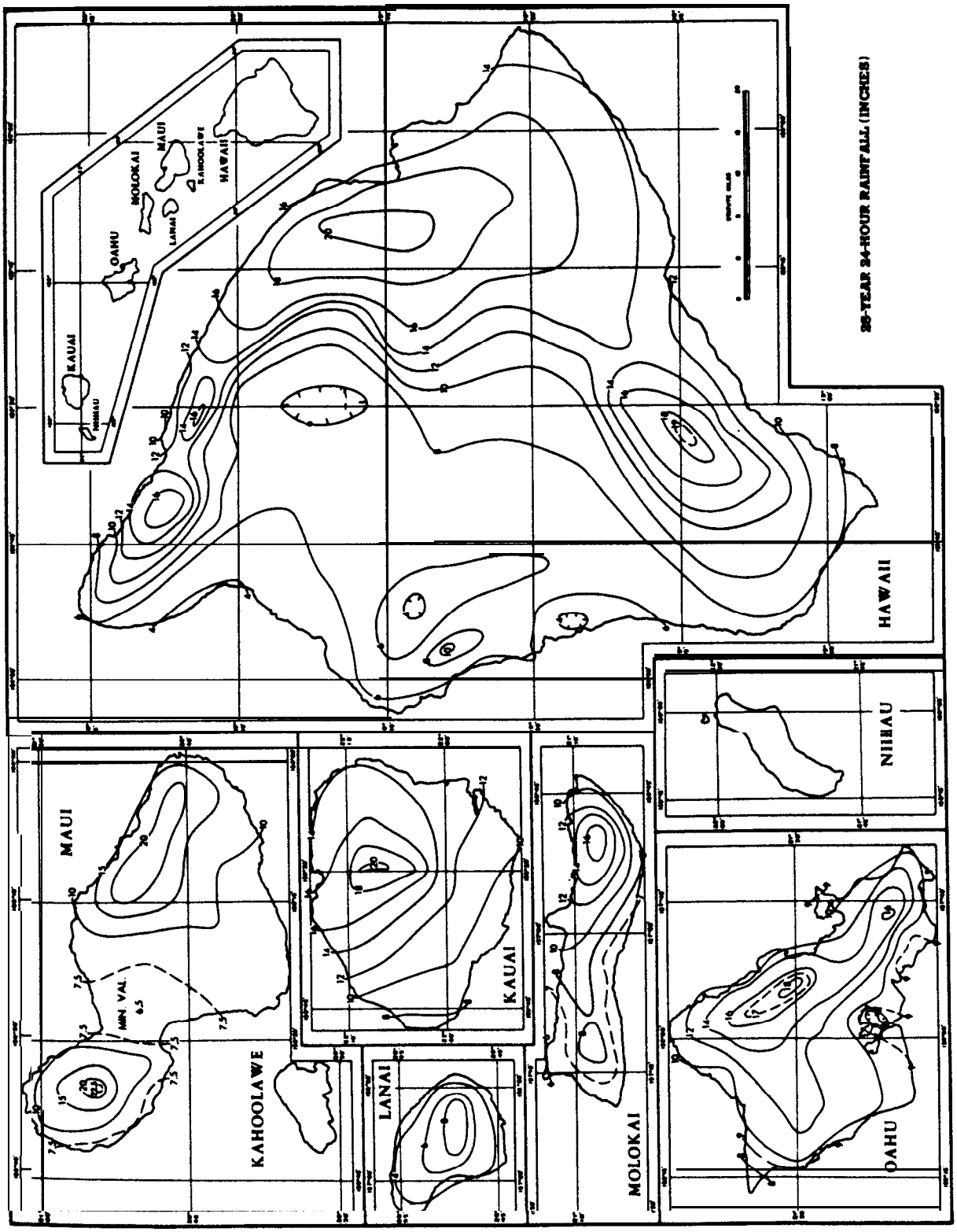
D. In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone;

E. Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.

F. In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on-site.

Applicability: This management measure is intended to be applied by States to activities on irrigated lands, including agricultural crop and pasture land (except for isolated fields of less than 10 acres in size that are not contiguous to other irrigated lands); orchard land; specialty cropland; and nursery crop production.

APPENDIX 3


25-YEAR 24-HOUR RAINFALL (INCHES)
HAWAII
NIIHAU
OAHU
MOLOKAI
LANAI
KAHOOLAWE
KAUAI
MAUI
MIN VAL 6.5

APPENDIX 4

Summary of the proposed critical wastewater disposal areas, see also Appendix I - Hawaii Administrative Rules, Title 11, Chapter 62, Section 11-62-05(a)

JOHN WAIHEE
GOVERNOR OF HAWAII

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
File:

SUMMARY OF THE PROPOSED CRITICAL WASTEWATER DISPOSAL AREAS

STATEWIDE

1. Within the 100 year flood plain; and
2. Groundwater recharge areas where defined.

ISLAND OF OAHU

The entire island of Oahu including no ground disposal of wastewater within the "No Pass" zone established by the Honolulu Board of Water Supply.

ISLAND OF HAWAII

1. The coastal area 1,000 feet from shoreline or 100 foot elevation, whichever is greater, including the coastal area from Hilo Bay down south to South Point, and up to North Kohala but excluding the coastal area from North Kohala to the Wailuku River;
2. All lots of less than five (5) acres which are situated in West Hawaii above the Drinking Water Protection Line;
3. The Kuhio Village (also known as Puukapu Village House Lots) in Quad Map H-25 (TMK 6-4-07);
4. The Kamuela Highlands Subdivision (also known as Hoonani Subdivision) in Quad Map H-25 (TMK 6-4-27 and TMK 6-4-28):
5. The Hilo Bay area which is defined as the area makai of Komohana Street bordered on the north by Wailuku River, to Puainako Street, along Puainako Street to where it meets the UIC Line, and along the UIC Line to where it intersects the shoreline. In addition, the CWDA include both east and west side of Kaumana Drive and north and

south side of Chong Street:

6. All lots of less than one (1) acre, in Geohydrologic Unit 6, excluding the Hilo Bay area as described in #5; and

7. The Vacation Land Subdivision and Kapoho Beach Lots, defined by using the UIC Line, North of Halekamahina, East of Kapoho Crater, and the Southern Boundary division line North of Pohakupala, (within the 29-79 grid of Quad Map H-74).

ISLAND OF MAUI

1. The entire inland and coastal areas of West Maui;

2. The isthmus area encompassing the Kihei and Kahului districts; and

3. The entire inland and coastal areas of East Maui except for the areas above the UIC Line in Geohydrologic Unit 8 (south western slopes of Haleakala).

ISLAND OF MOLOKAI

1. The coastal areas of west Molokai within 1,000 feet inland or 100 foot elevation, whichever is greater from the shoreline; and

2. The entire inland and coastal areas of East Molokai bounded by the Molokai Forest Reserve Boundary and UIC Line in the central part of Molokai.

ISLAND OF LANAI

1. The area 1,000 foot inland or 100 foot elevation, whichever is greater from the shoreline; and

2. All areas above the UIC Line.

ISLAND OF KAUAI

1. The coastal area 1,000 feet from shoreline or 100 foot elevation, whichever is greater, except the coastal area between Kekaha and Waimea where the inland boundary is at the 40 foot elevation and the areas from Kalalau to

Moloaa where the inland boundary is the Hanalei District Boundary:

2. Within a 1,000 foot radius of all existing and projected drinking water sources;

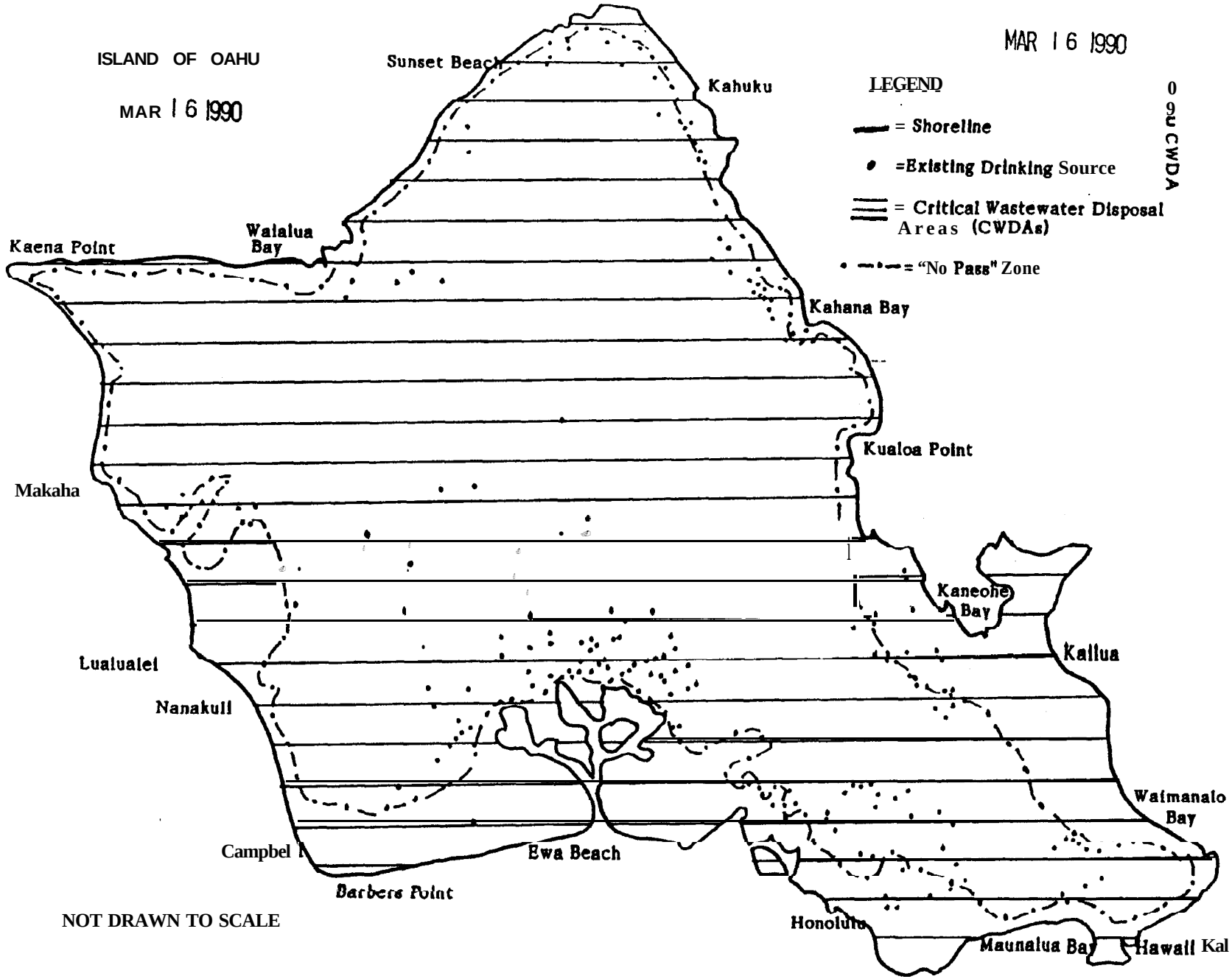
3. All lots less than one (1) acre in the inland areas except for:

   A. The Hanapepe - Roloa area, the area bounded by the Port Allen Road to the intersection of Kaumualii Highway, then east along Kaumualii Highway to where it meets the UIC Line near the Wahiawa Stream, then east on the UIC Line to Koloa Town where the UIC Line intersects the west boundary of the urban land use district, then south to where the zoning boundary meets the Private Cane Haul Road, then west along the Cane Haul Road to the east boundary of the agricultural zone near Kalaheo Gulch, then south to a 1,000 feet from shoreline and then west along 1,000 feet from shoreline to Port Allen Road: and

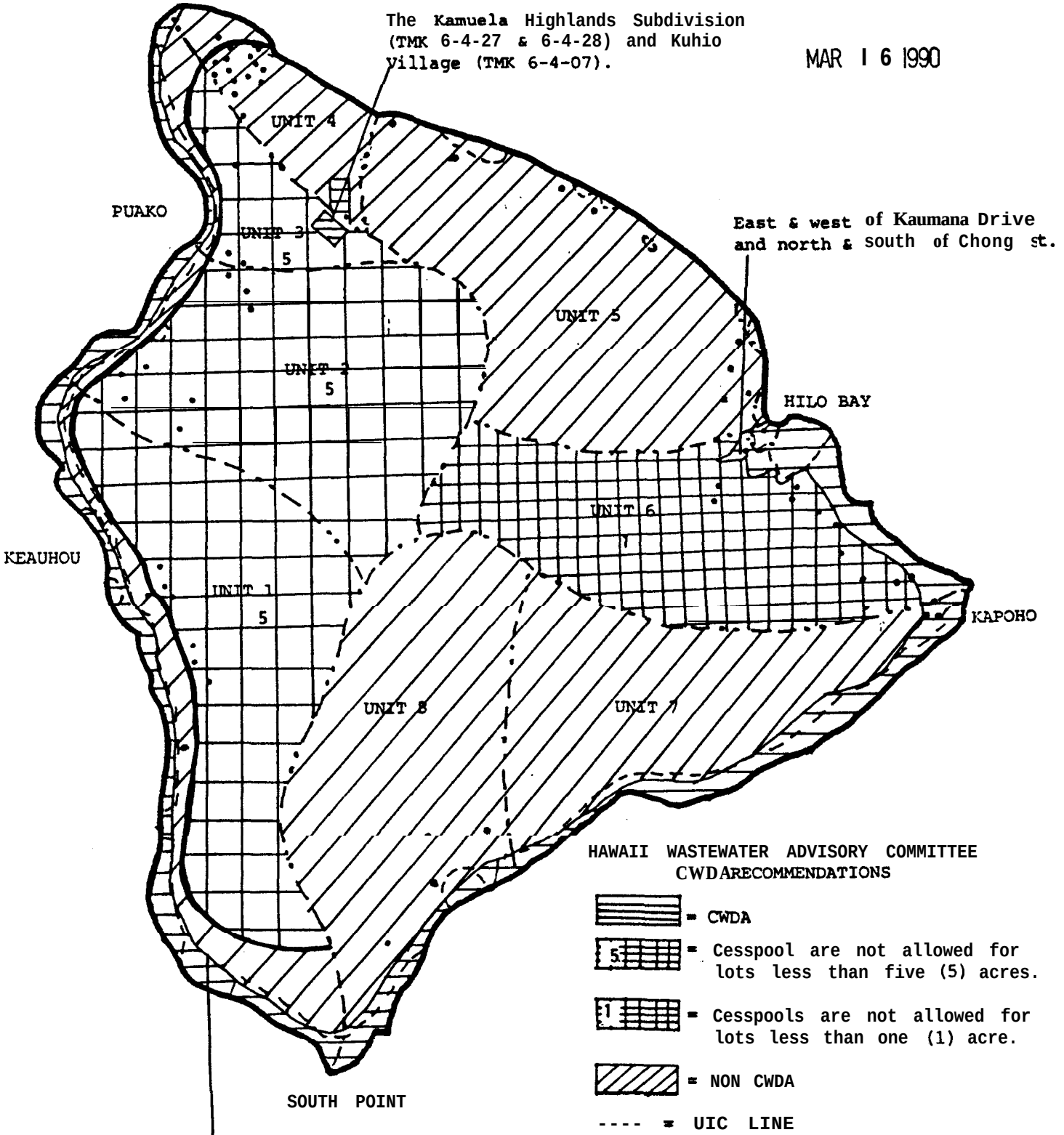
   B. Below the UIC Line on the plateaus east and west of Anahola and Papaa Streams.

4. Waimea Canyon State Park and Kokee State Park bounded by the state park boundaries as delineated by the Indefinite Boundary (U.S.G.S. Quad Maps K-l, K-2, K-3, and K-4).

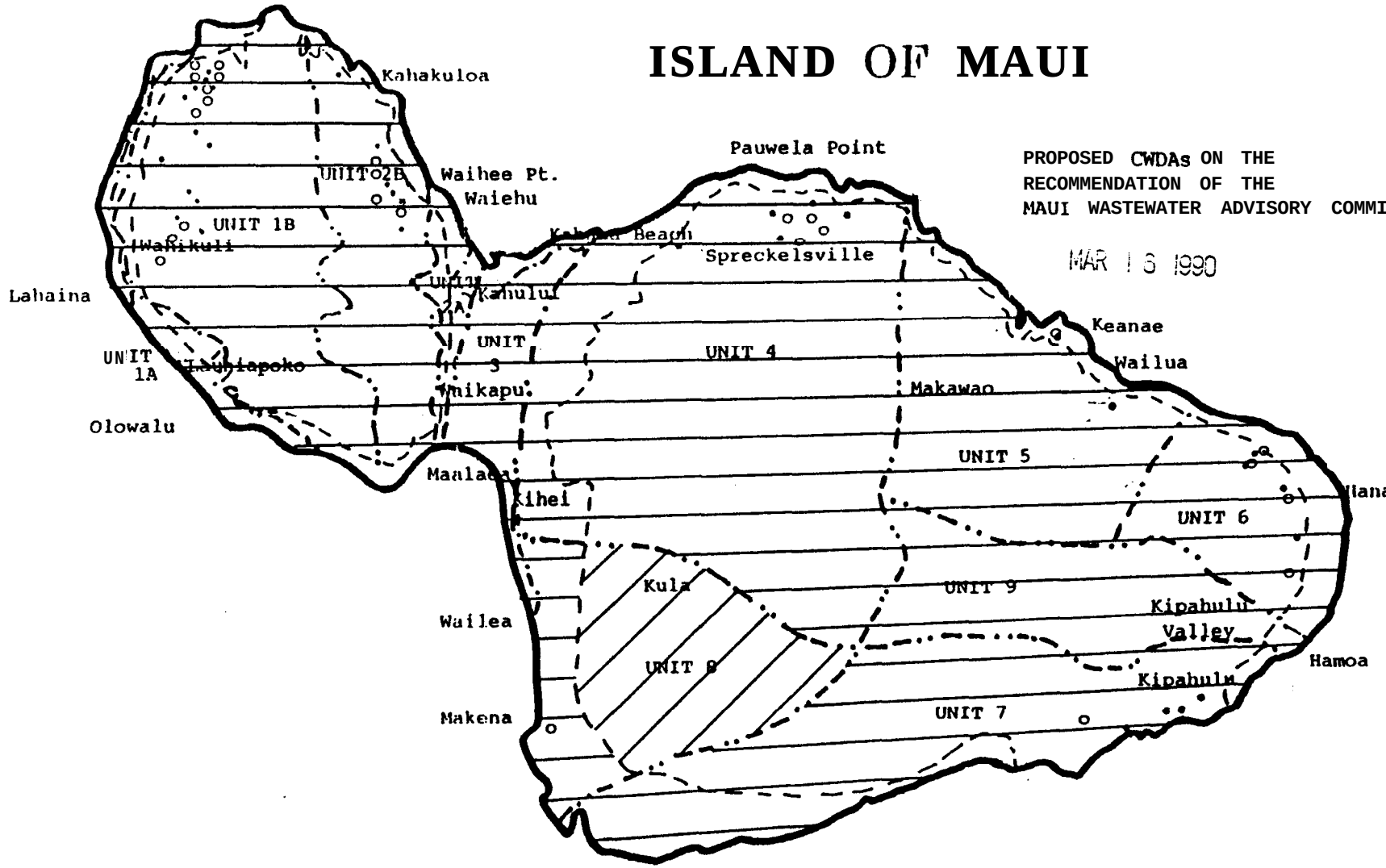
(Note: More detailed descriptions of the proposed Critical Wastewater Disposal Areas (CWDAs) are contained in the Wastewater Advisory Committee recommendations report. Detailed maps of the proposed CWDAs are on file at the District Health Office on the neighbor islands and at the Wastewater Branch on Oahu.)


ISLAND OF OAHU
MAR 16 1990
MAR 16 1990
LEGEND
= Shoreline
=Existing Drinking Source
= Critical Wastewater Disposal Areas (CWDAs)
= "No Pass" Zone
Sunset Beach
Kahuku
Waialua Bay
Kaena Point
Kahana Bay
Kualoa Point
Makaha
Kaneohe Bay
Kailua
Lualualei
Nanakuli
Waimanalo Bay
Campbell
Ewa Beach
Barbers Point
Honolulu
Maunalua Bay
Hawaii Kai
NOT DRAWN TO SCALE

ISLAND OF HAWAII



ISLAND OF MAUI



PROPOSED CWDAs ON THE
RECOMMENDATION OF THE
MAUI WASTEWATER ADVISORY COMMITTEE

MAR 16 1990

LEGEND

- = Shoreline
- = UIC Line
- = Existing Drinking Source
- 0 = Potential Drinking Source
- = Sewer Line
- = Geohyrdrologic Unit

Proposed NOT CRITICAL areas.

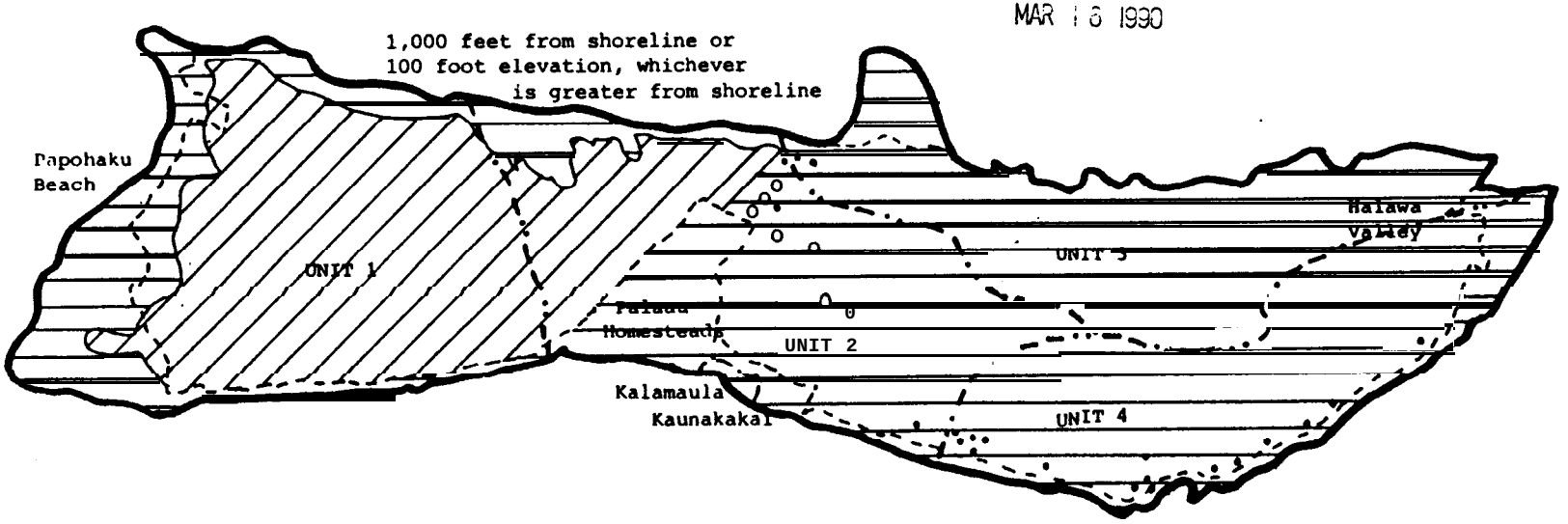
Proposed CRITICAL WASTEWATER DISPOSAL AREAS (CWDAs).
(NO CESSPOOLS will be allowed)

NOT DRAWN TO SCALE.

ISLAND OF **MOLOKAI**

, PROPOSED CWDAs ON THE
RECOMMENDATION OF THE
MAUI WASTEWATER ADVISORY COMMITTEE

MAR 1 3 1990



LEGEND

- = Shoreline
- UIC Line
- = Existing Drinking Source
- = Potential Drinking Source
- = Sewer Line
- = Geohydrologic Unit

ropo..d NOT CRITICAL areas.

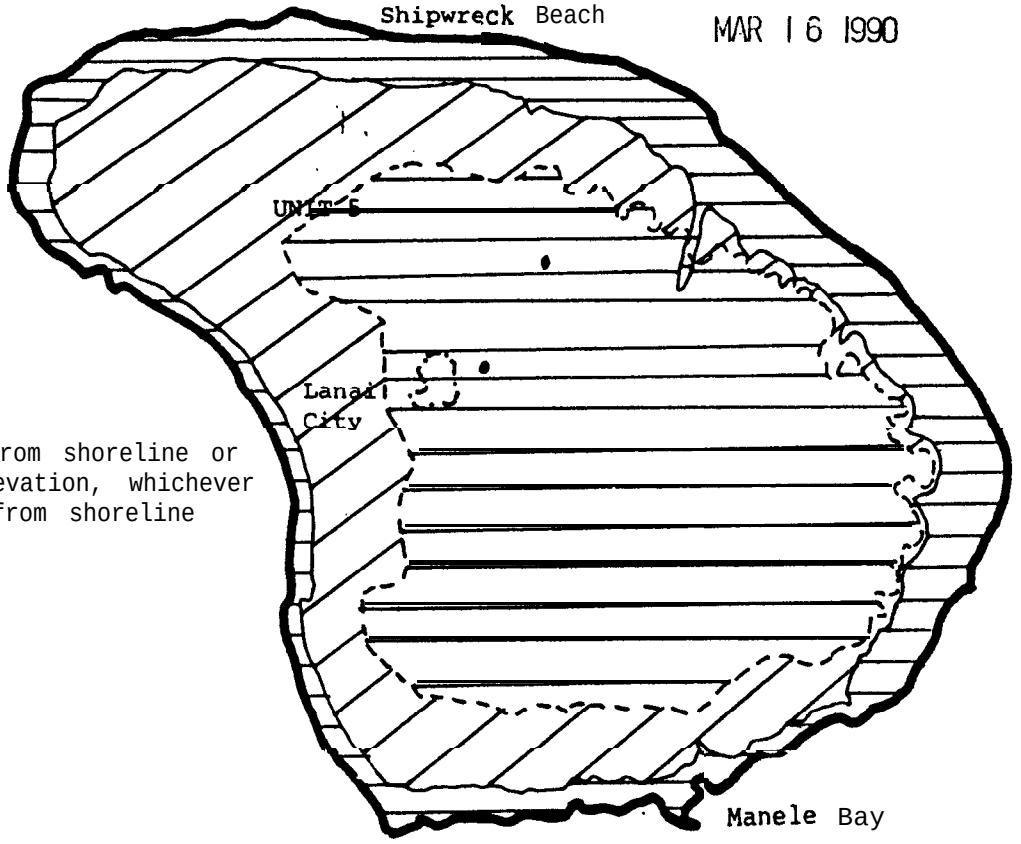
Proposed CRITICAL WASTEWATER
DISPOSAL AREAS (CWDAs).
(NO CESSPOOLS will be allowed)

NOT DRAWN TO SCALE.

ISLAND OF LANAI

PROPOSED CWDAs ON THE
RECOMMENDATION OF THE
MAUI WASTEWATER ADVISORY COMMITTEE

MAR 16 1990



1,000 feet from shoreline or 100 foot elevation, whichever is greater from shoreline

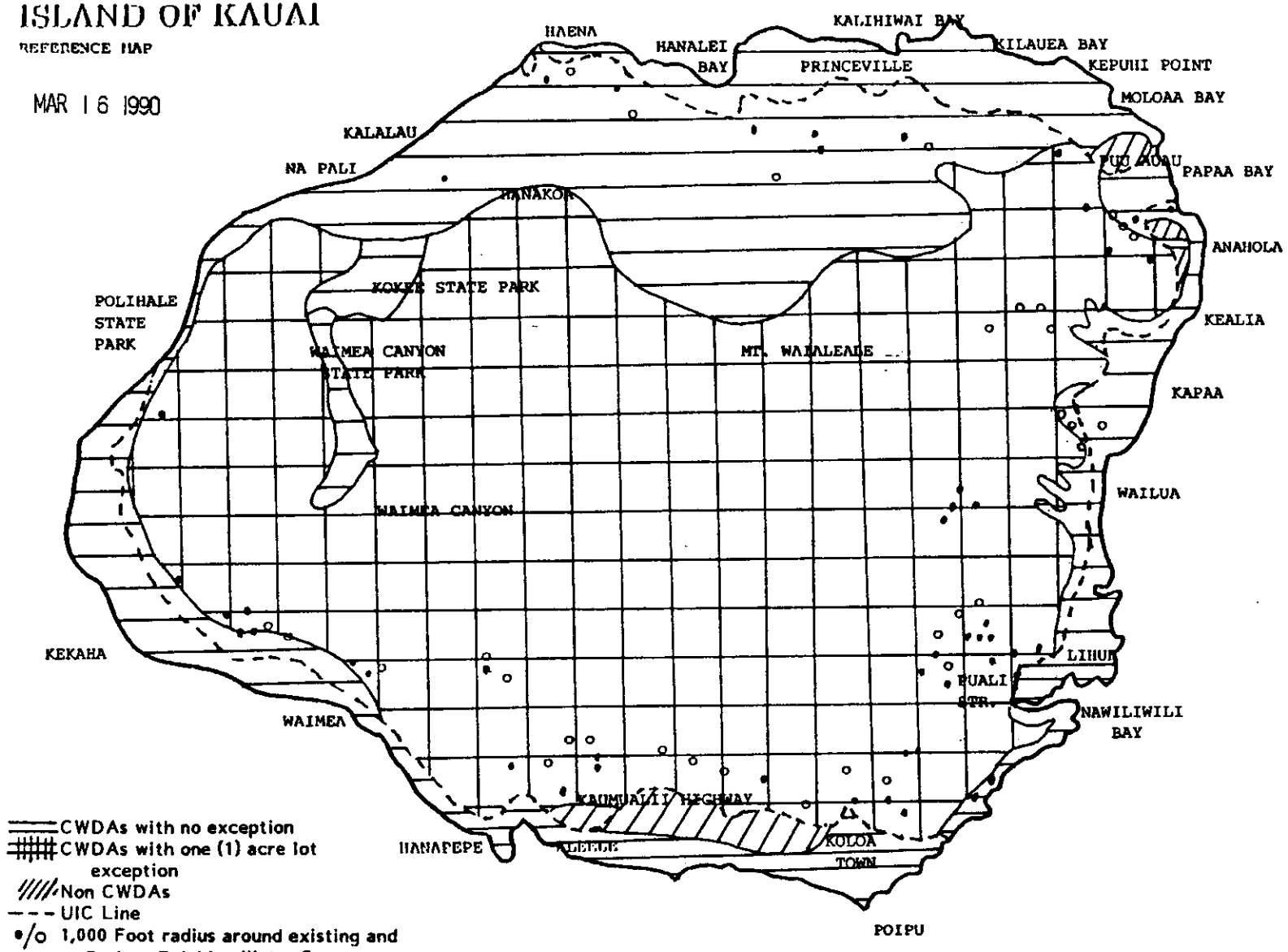
LEGEND

- Shoreline
- UIC Line
- Existing Drinking Source
- Potential Drinking Source
- Sewer Line
- Unit 5 = Geohydrologic Unit

@ Proposed NOT CRITICAL areas.

Proposed CRITICAL WASTEWATER DISPOSAL AREAS (CWDAs). (NO CESSPOOLS will be allowed)

NOT DRAWN TO SCALE.


ISLAND OF KAUAI
REFERENCE MAP
MAR 16 1990
HAENA
HANALEI BAY
KALIHIWAI BAY
KILAUEA BAY
PRINCEVILLE
KEPUHI POINT
MOLOAA BAY
KALALAU
NA PALI
PUU AOAU
PAPAA BAY
HANAKOA
ANAHOLA
KOKEE STATE PARK
POLIHALE STATE PARK
KEALIA
WAIMEA CANYON STATE PARK
MT. WAIALEALE
KAPAA
WAILUA
WAIMEA CANYON
KEKAHA
LIHUE
PUALI
STR.
NAWILIWILI BAY
WAIMEA
KAUMUALII HIGHWAY
HANAPEPE
KOLOA
TOWN
POIPU
CWDAs with no exception
CWDAs with one (1) acre lot exception
Non CWDAs
UIC Line
1,000 Foot radius around existing and Project Drinking Water Sources

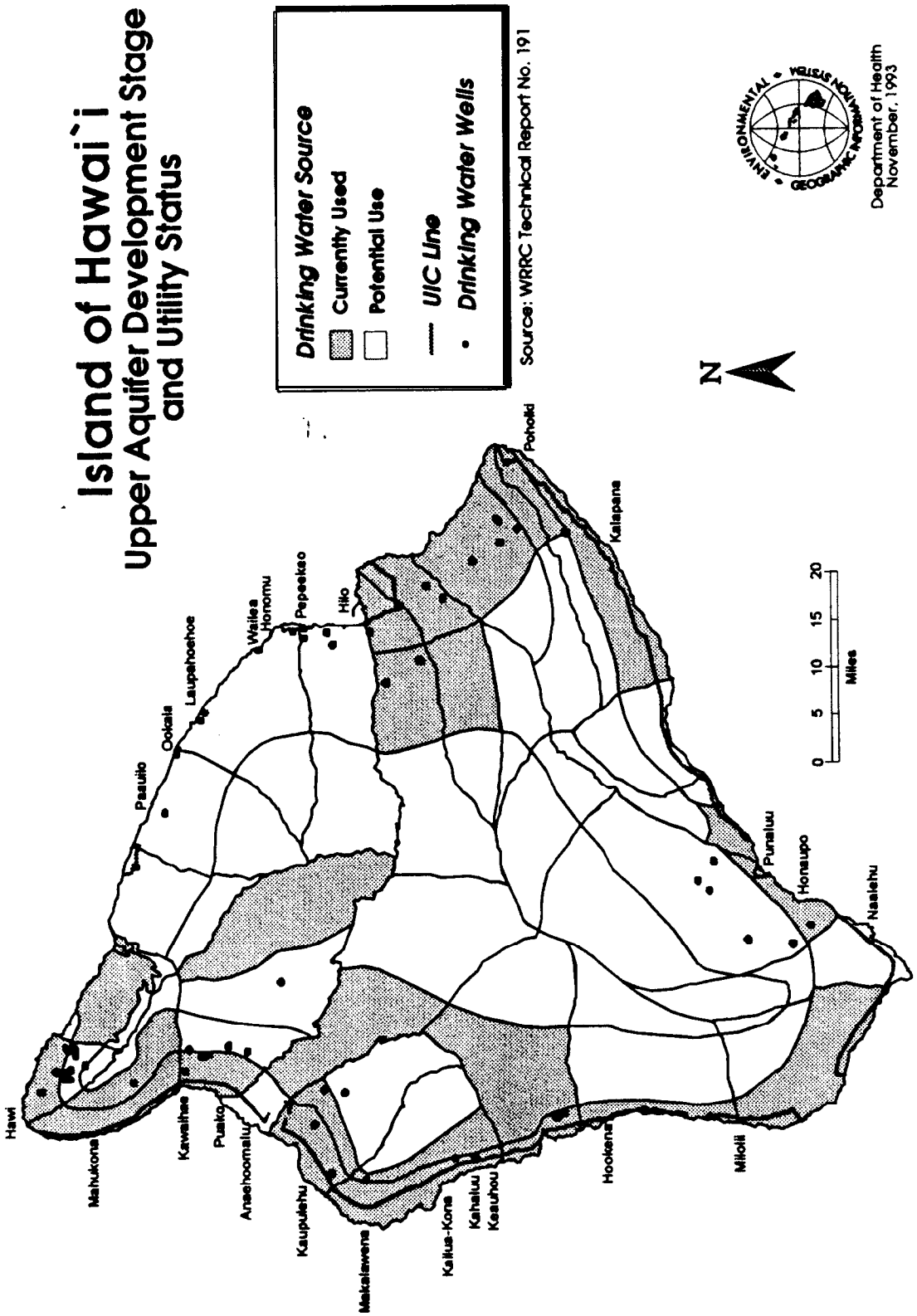
APPENDIX 5

AQUIFER IDENTIFICATION AND CLASSIFICATION

In response to the need to identify and describe aquifers for each island to serve as a frame work for ground water protection strategy, a program was initiated to classify and assign codes to the principal aquifers of the State. A fundamental objective of the ground water protection strategy is to classify aquifers according to hydrogeologic parameters, ground water by quality characteristics relative to beneficial uses, and ground water vulnerability to contamination. The following University of Hawaii, Water Resources Research Center technical reports were published for this program:

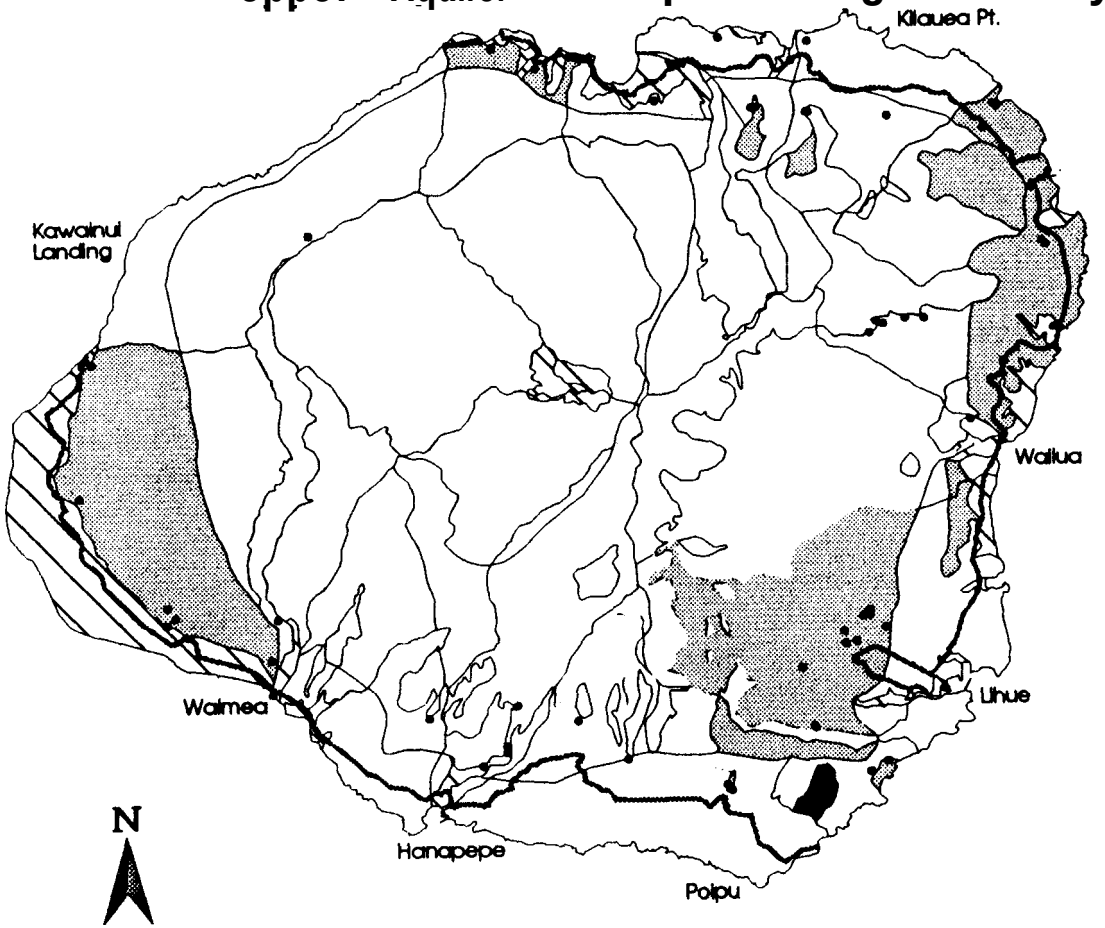
No. 179, O'ahu
No. 185, Maui
No. 186, Kaua'i
No. 187, Moloka'i
No. 190, Lana'i
No. 191, Hawai'i

The following maps are provided to identify only the upper aquifer development stage and utility status due to their highly vulnerable position. Note that the under laying aquifer is not necessarily designated similarly. The underground injection control line or UIC line is also identified on these maps, see Appendix I - Hawaii Administrative Rules, Title 11, Chapter 23.


Island of Hawai`i
Upper Aquifer Development Stage
and Utility Status
Drinking Water Source
Currently Used
Potential Use
UIC Line
Drinking Water Wells
Source: WRRC Technical Report No. 191
N
0 5 10 15 20
Miles
Department of Health
November, 1993
Hawi
Mahukona
Kawaihae
Puako
Anaehoomalu
Kaupulehu
Makalawena
Kalua-Kona
Kahaluu
Keauhou
Hookena
Milolii
Naalehu
Honaupo
Punaluu
Pohoiki
Kalapana
Hilo
Pepeekeo
Honomu
Waiea
Laupahoehoe
Ookala
Pasuito

Island of Kaua`i

Upper Aquifer Development Stage and Utility Status



Drinking water source
- Currently Used
- Potential Use

Ecologically Important
- Potential use

Non-Drinking Water Source
- No Potential Use

- *UIC Line*
- *Drinking Water Wells*

Source: WRRC Technical Report No. 186

ENVIRONMENTAL GEOGRAPHIC INFORMATION SYSTEM

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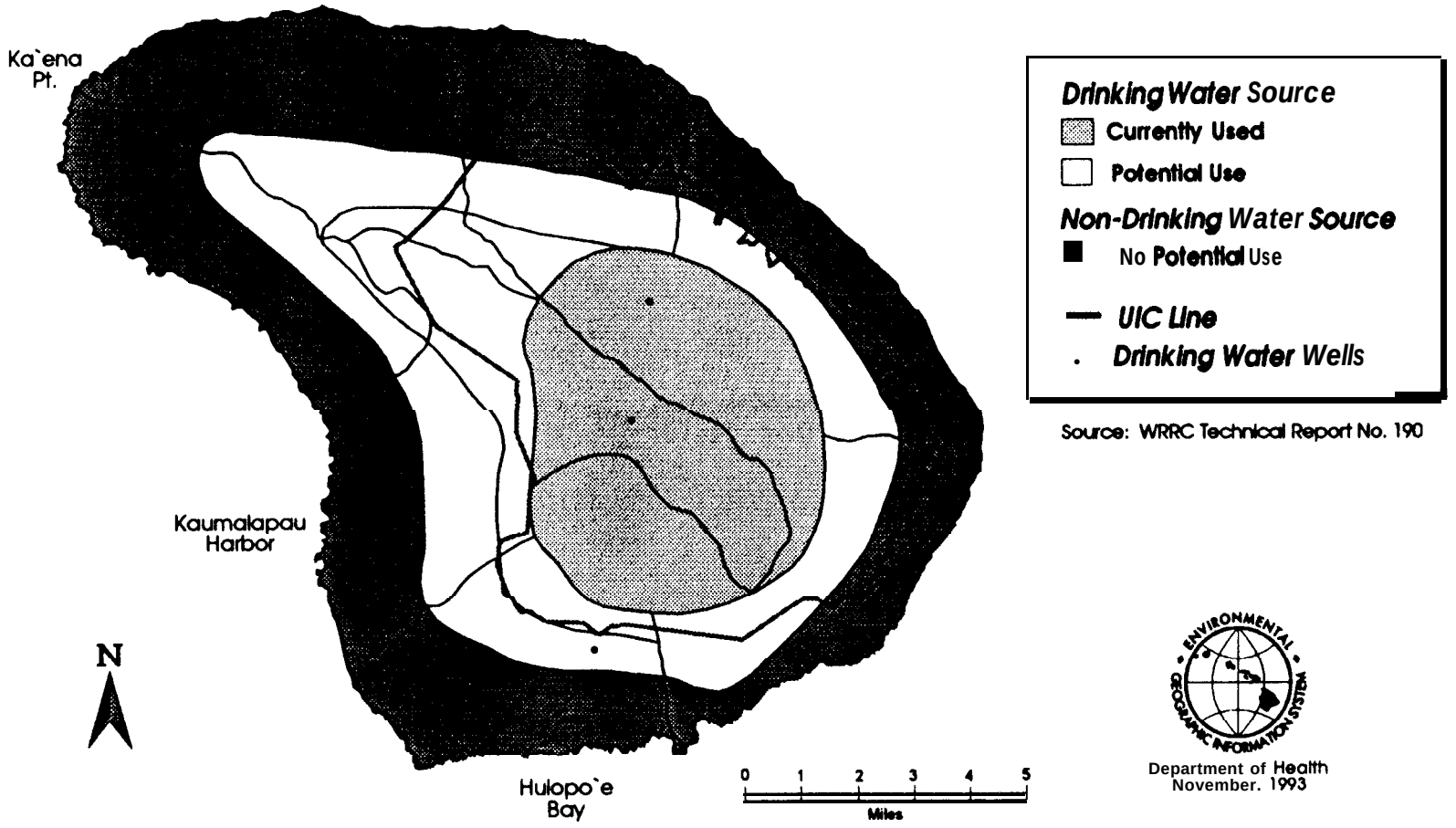
November, 1993

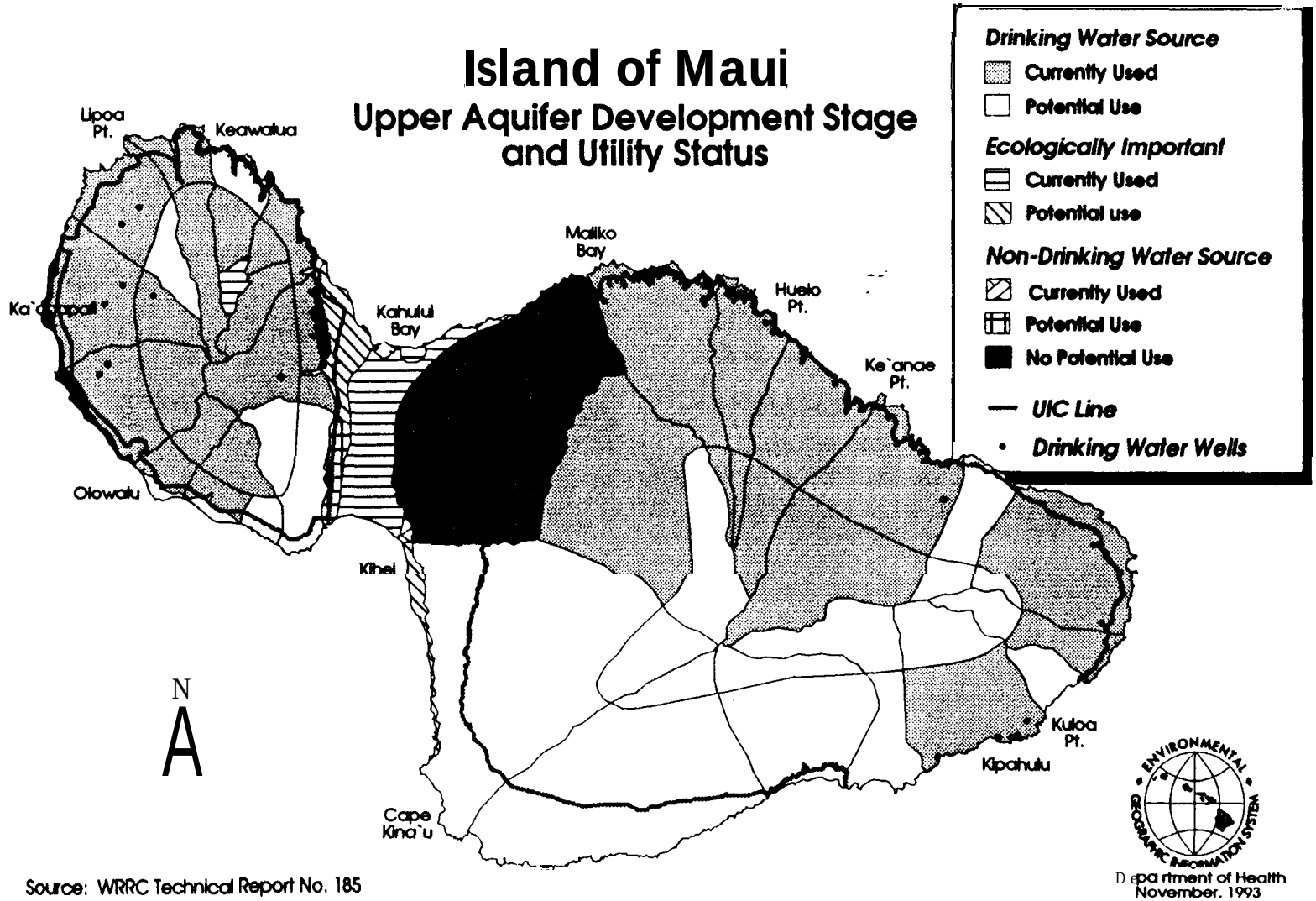
Island of Lāna`i

Upper Aquifer Development Stage and Utility Status

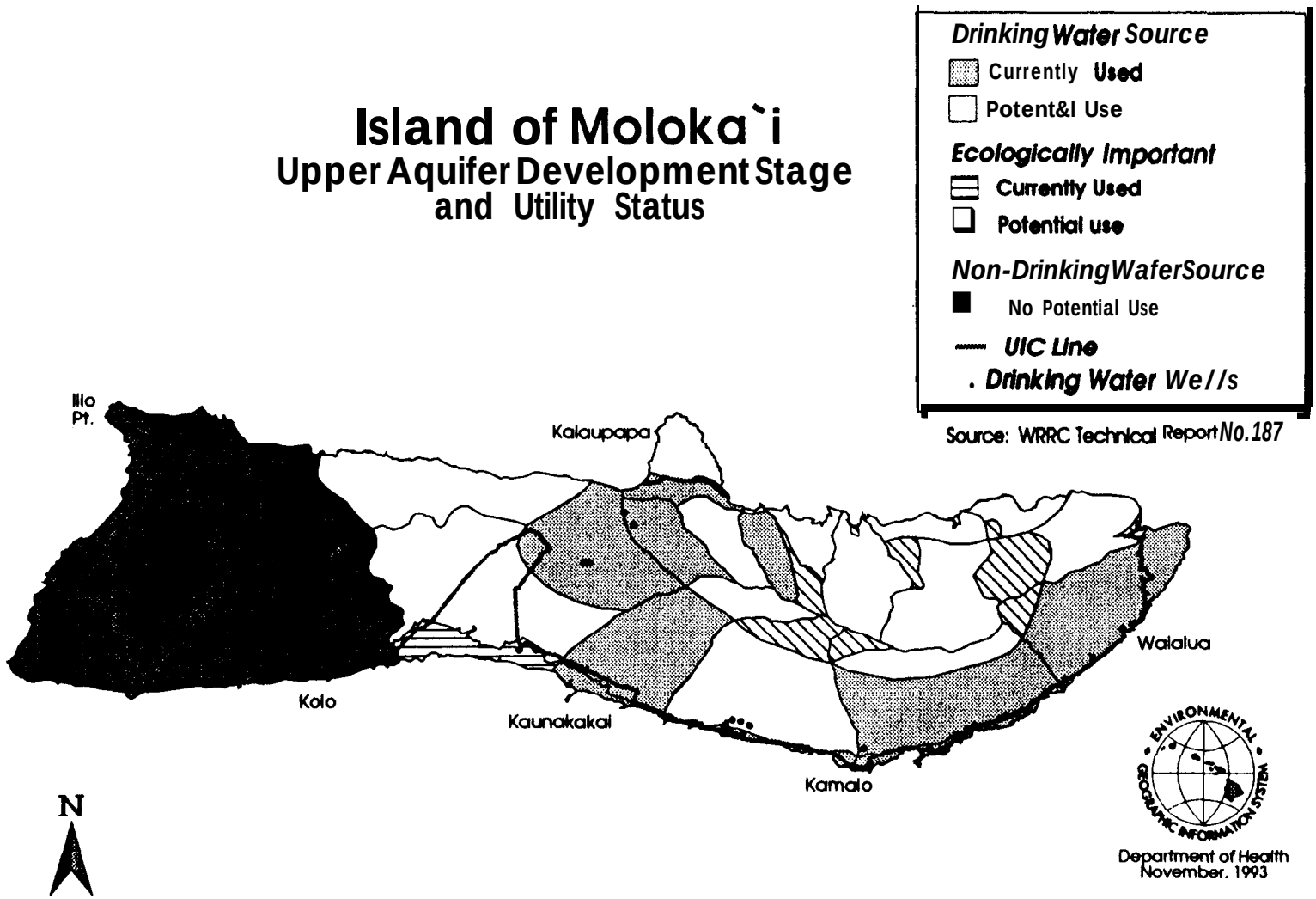


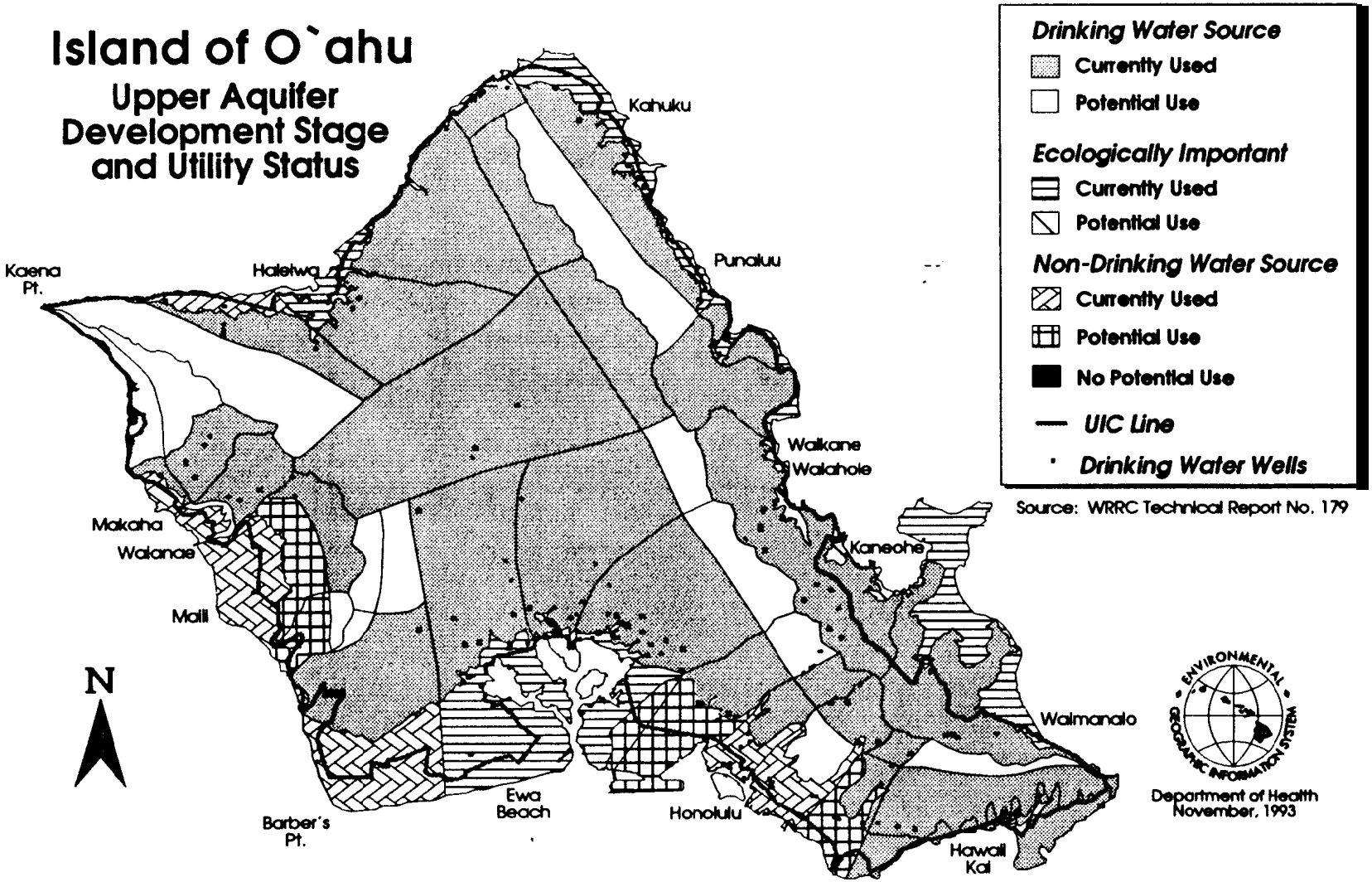
Source: WRRC Technical Report No. 190

Department of Health
November. 1993


Island of Maui
Upper Aquifer Development Stage
and Utility Status
Drinking Water Source
Currently Used
Potential Use
Ecologically Important
Currently Used
Potential use
Non-Drinking Water Source
Currently Used
Potential Use
No Potential Use
UIC Line
Drinking Water Wells
Lipoa Pt.
Keawalua
Maliko Bay
Huelo Pt.
Kahului Bay
Ke`anae Pt.
Olowalu
Kihei
Kuloa Pt.
Kipahulu
Cape Kina`u
N
A
Source: WRRC Technical Report No. 185
Department of Health
November, 1993

Island of Moloka`i
Upper Aquifer Development Stage and Utility Status




Island of O`ahu
Upper Aquifer
Development Stage
and Utility Status
Drinking Water Source
Currently Used
Potential Use
Ecologically Important
Currently Used
Potential Use
Non-Drinking Water Source
Currently Used
Potential Use
No Potential Use
UIC Line
Drinking Water Wells
Source: WRRC Technical Report No. 179
Kahuku
Punaluu
Kaena Pt.
Haleiwa
Waikane
Waiahole
Kaneohe
Makaha
Waianae
Maili
N
Waimanalo
Ewa Beach
Barber's Pt.
Honolulu
Hawaii Kai
ENVIRONMENTAL GEOGRAPHIC INFORMATION SYSTEM
Department of Health
November, 1993

APPENDIX 6

COMPONENTS FOR LIVESTOCK WASTE MANAGEMENT SYSTEMS

September 1994

INTRODUCTION

This appendix discusses, in general, the components for livestock waste management systems. Detailed descriptions may be found in other references.

Alternatives for managing livestock waste are available for any operation. A component can be a piece of equipment such as a pump; a structure such as a waste storage tank; or an operation such as cornposting. Components should be simple, manageable, durable, compatible, integrated with each other, and require low maintenance.

In the selection of the components, livestock operators must consider their available monetary and time resources for the operation and maintenance of the system.

GOALS OF ANIMAL WASTE MANAGEMENT

The primary goals of animal waste management are:

To collect and store all solid and liquid waste on-site in a way that prevents wastes from entering surface water, and prevents seepage of nutrients into ground water;

To manage both solid and liquid waste, preferably by proper land application for crop production and soil enhancement, without excessively loading the soil profile which could result in ground water pollution;

To control odors, flies, rodents, and other vermin;

To economically install a system that will solve present problems and prevent future animal waste problems.

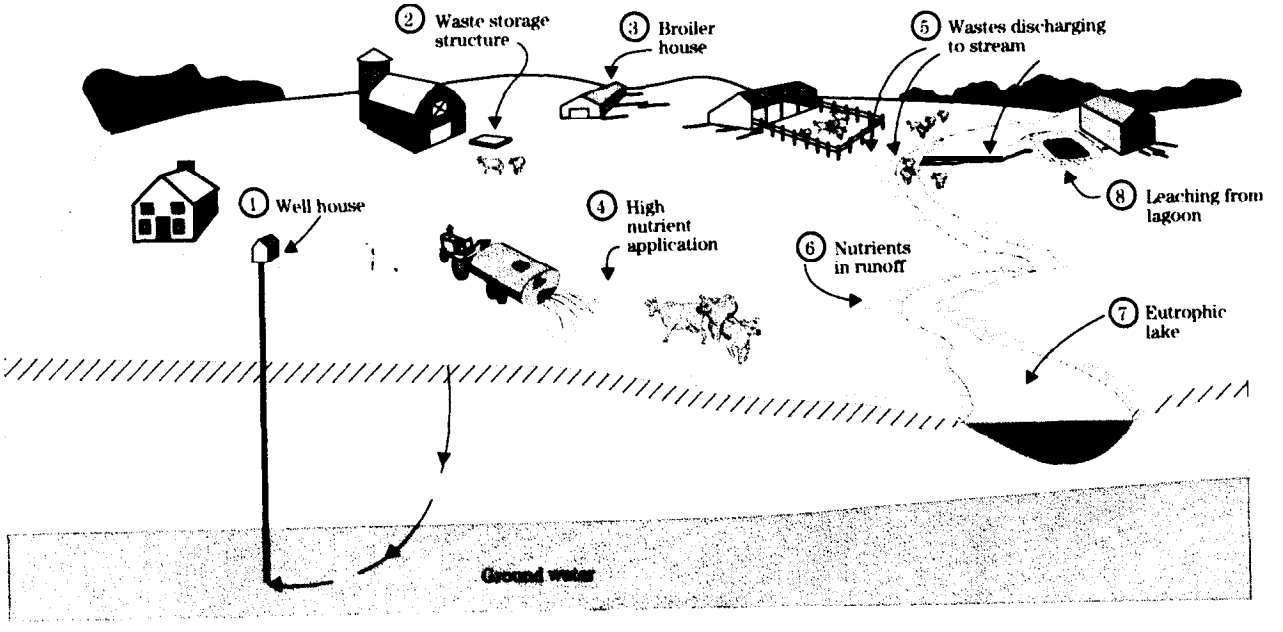
ANIMAL WASTE MANAGEMENT CONCERNS

Animal waste contains elements which may impact surface and ground water quality. The common pollutants are suspended solids, organic wastes, bacteria, and nutrients such as nitrogen and phosphorus.

The major effect of poor waste management is degradation of water quality. Principal problems that may be associated with

discharges from poorly operated confined feeding operations are shown in Figure 1.

Figure 1 - Possible sources of ground and surface water pollution from animal waste.



1. Contaminated well: Well water contaminated by bacteria and nitrates because of leaching through soil. (See item 4.)
2. Waste storage structure: Poisonous and explosive gases in structure.
3. Animals in poorly ventilated building: Ammonia, hydrogen-sulfide and other gases create respiratory and eye problems in animal and corrosion of metals in building
4. Waste applied at high rates: Nitrate toxicity and other nitrogen related diseases in cattle grazing cool-season grasses; leaching of nitrate and micro-organisms through soil, fractured rock and lava tubes.
5. Discharging lagoon, runoff from open feedlot, and cattle in creed: (a) Organic matter creates low dissolved oxygen levels in stream; (b) Ammonia concentration reaches toxic limits for fish; and (c) Stream is enriched with nutrients, contributing to excessive algae growth in surface water.
6. Runoff from fields where livestock waste is spread and no conservation practices on land: Phosphorus, and nitrogen

attached to eroded soil particles and soluble nutrients reach surface water and support excessive algae growth.

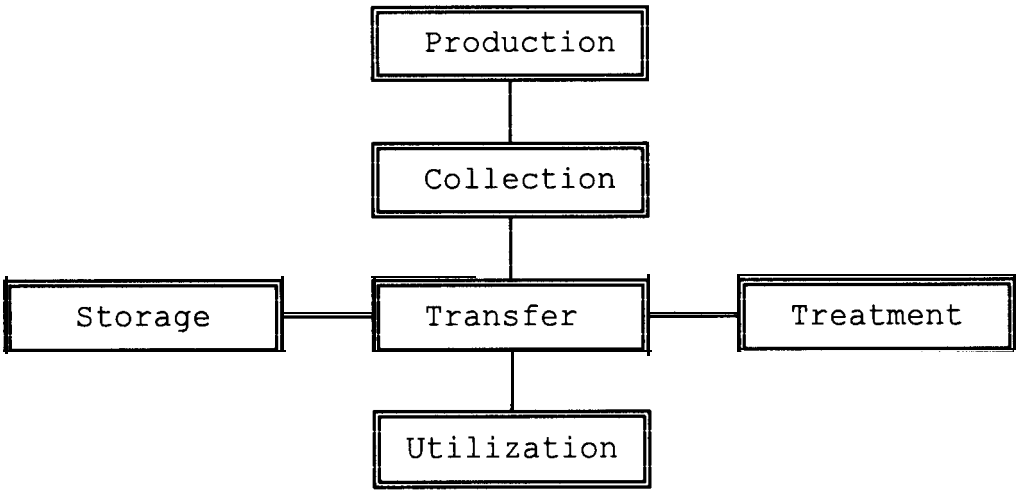
7. Eutrophic conditions. Excess algae and aquatic weeds created by contributions from items 5 and 6; nitrite poisoning (brown-blood disease) in fish because of high nitrogen levels in bottom muds.
8. Leaching of nutrients and bacteria from poorly sealed lagoon: May contaminate ground water or resurface to contaminate surface water.

AGRICULTURAL WASTE MANAGEMENT FUNCTIONS

Livestock waste management systems must be developed using the total systems approach. A total systems approach accounts for all the waste throughout the year from production to utilization.

A livestock waste management system consists of six basic functions:

Figure 2 – Waste management functions



Functions may be combined, repeated, eliminated or arranged as necessary.

PRODUCTION

Production is the amount and nature of the waste generated by the operation. Production includes the kind, consistency, volume, location, and timing of the waste produced.

COLLECTION

Collection is the initial capture and gathering of the waste from the point of origin or deposition to a collection point.

Collection involves the method, location, scheduling, labor requirements, and equipment needed to gather the waste.

STORAGE

Storage is the temporary containment of waste. Storage facilities provide flexibility over the scheduling and timing for use of the waste product. Waste may be scheduled for land application when: the spreading operation does not interfere with other necessary tasks; weather and field conditions are suitable; and when the nutrients can be best used by the crop.

TREATMENT

Treatment is any function such as physical, biological, and chemical designed to reduce the pollution potential of the waste.

TRANSFER

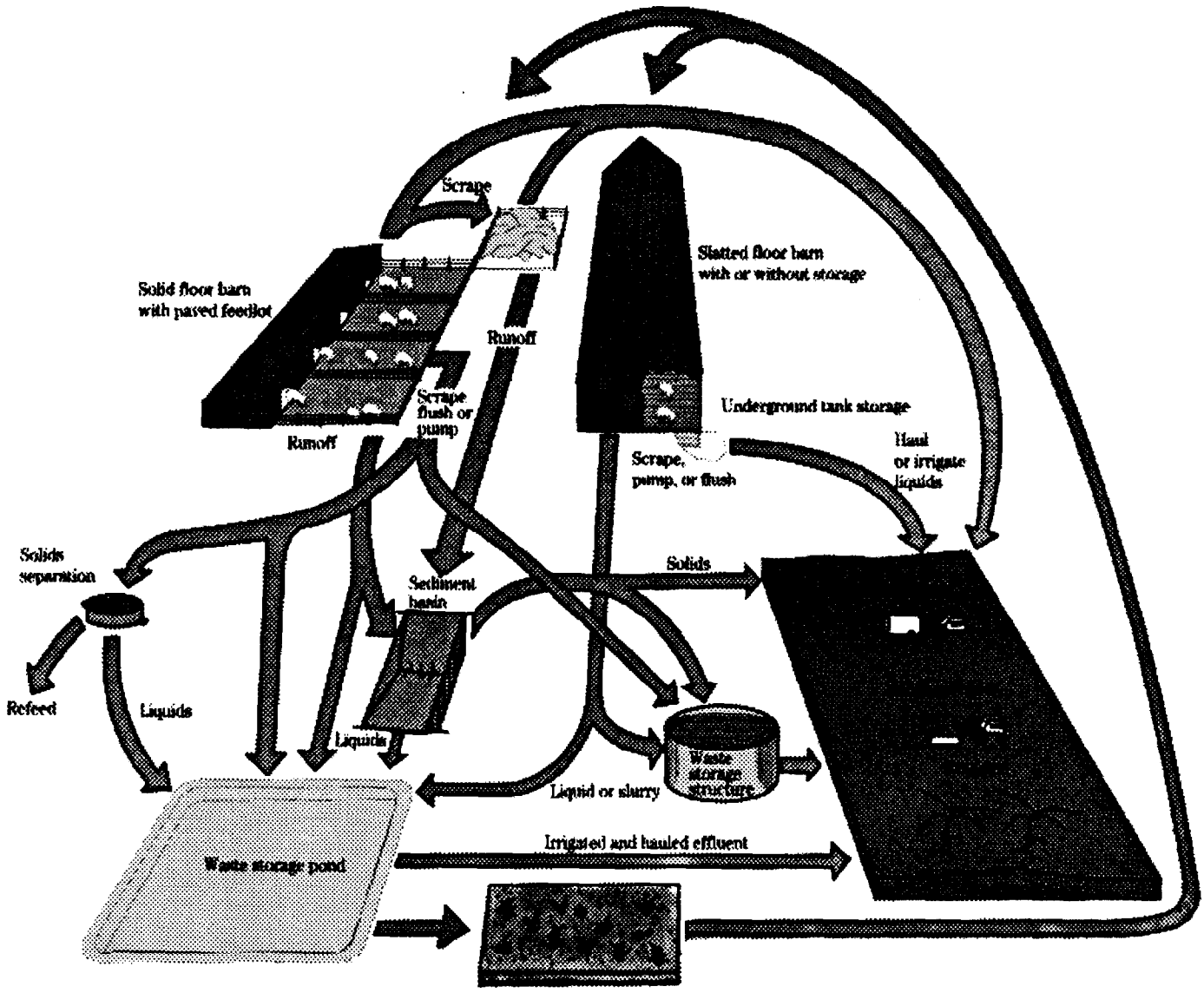
This refers to the movement and transportation of the waste throughout the system. It includes the transfer of waste from collection to storage, to treatment, and to utilization.

UTILIZATION

Utilization includes recycling reusable waste products and reintroducing non-reusable waste products into the environment. Waste may be used as a source of energy, bedding, animal feed, mulch, organic matter, or plant nutrients.

SWINE WASTE HANDLING COMPONENTS

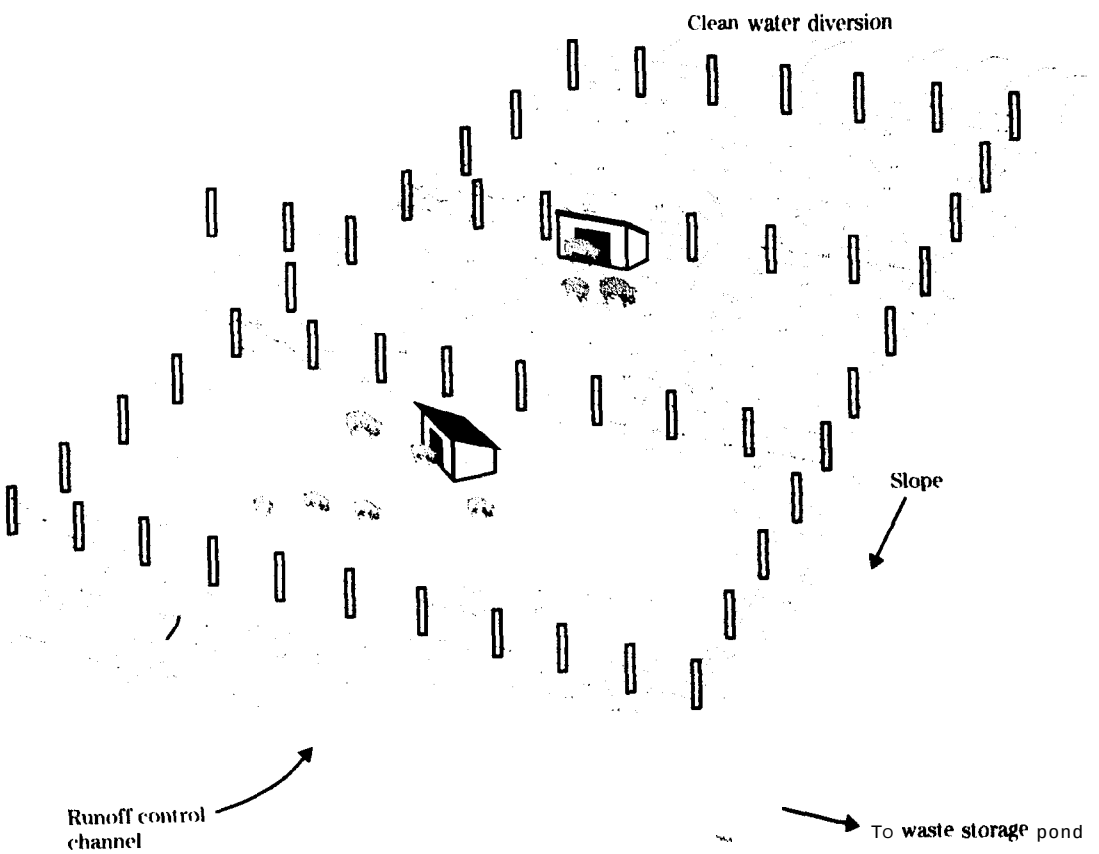
Figure 3 - Swine waste handling options



Open systems such as pastures, feedlot systems, confinement systems, or a combination of these are used for raising swine.

Raising hogs in an open system may appear to have a low initial investment, but often results in animal health and pollution control problems. Even if sufficient land is available, hogs tend to congregate and concentrate their waste. This can be prevented by moving the feeding, waterfng, and housing facilities and by rotating the hogs through a series of open lots. Hogs raised in an open system should not have unrestricted access to streams. Runoff is difficult to manage in an open system because of the large area and topographic limitations (Figure 4). Rather than invest the capital and time necessary to install and manage an extensive runoff management system, it may be more efficient to convert to a more concentrated operation.

Figure 4 - Runoff control for an open system. Clean runoff is diverted away from the pasture. Runoff from the holding area is discharged to a waste storage pond.

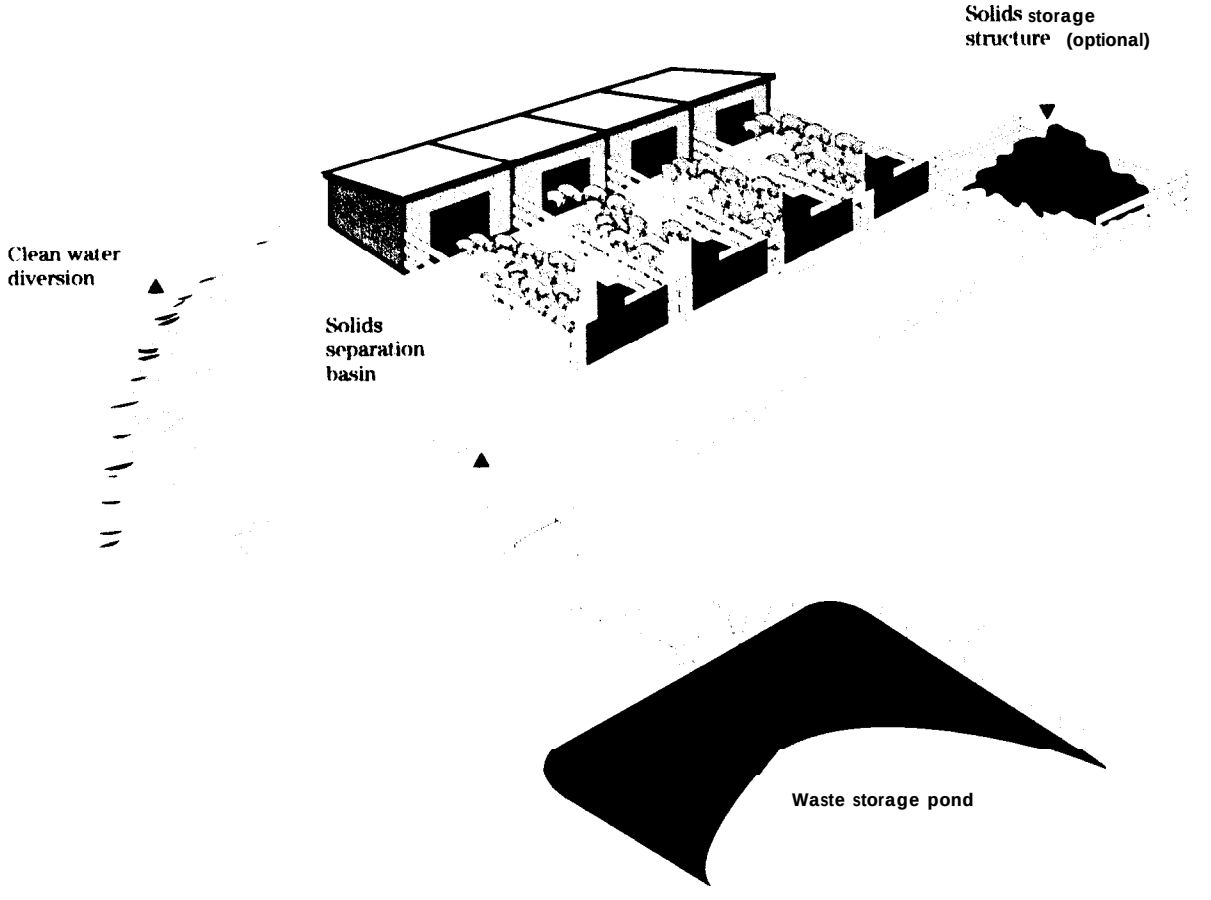


Manure in feedlot systems can be handled as a solid if the feedlots are cleaned regularly, sufficient bedding is added to the manure, and the collected manure is protected from excessive precipitation. It can also be handled as a slurry or liquid, but measures must be taken to manage contaminated runoff. Total confinement systems eliminate the need to manage contaminated runoff and may allow for more automation in waste management.

Odors are an inherent characteristic of swine operations. Odor does not, per se, constitute air pollution. A swine waste management system should incorporate odor control measures where possible. Many complaints can be eliminated with a clean, neat appearance; efficient management system (Figure 5); and positive public relations with those affected by the odors.

Proper manure system planning, maintenance, and operation can reduce the intensity of odor. For example, increasing the manure treatment lagoon volume and covered manure storage facilities can reduce the odor. Application of manure to the land should be timed to minimize potential odor complaints. Injection or incorporating the manure into the soil will reduce odor.

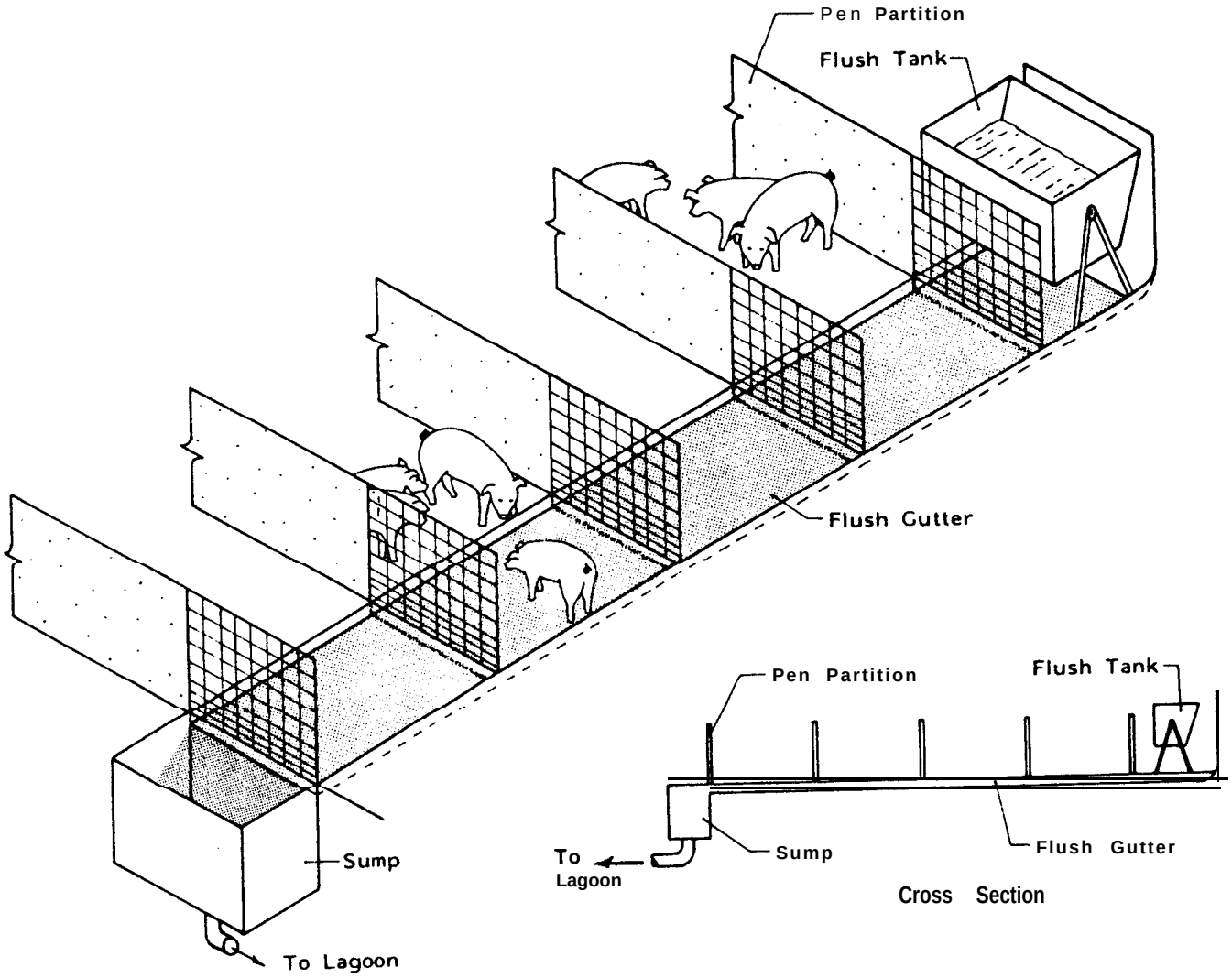
Figure 5 - Manure scraped and handled as a solid on paved lot operation. Diversion above facility diverts water away. Contaminated runoff flows into a waste pond.



(1) Production

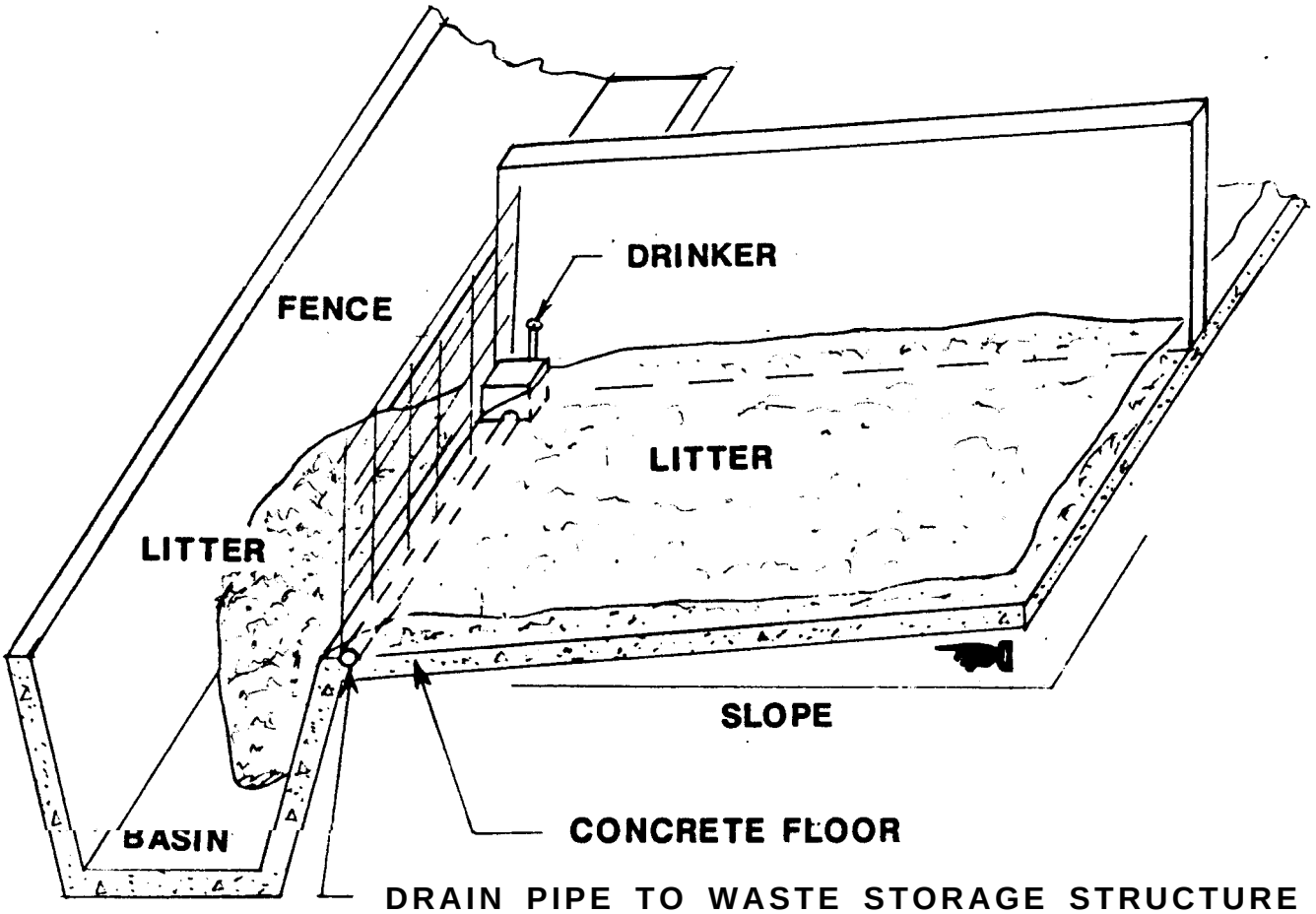
Waste associated with swine operations includes manure and possibly contaminated runoff. In some systems provisions must be made to manage flush water (Figure 6). Hogs tend to play with watering and feeding facilities which can add to the waste load. The disposal of dead pigs may be a resource concern in some operations.

Figure 6 - Swine flush alley with tipping bucket tank. After flushing, waste water flows to lagoon or other storage facility.



Dry litter used in the production of swine produces little liquid waste, little runoff, a relatively dry material and less odor. Dry litter such as wood shavings, straw, nut husks and shells are used as bedding material in the pens (Figure 7). Litter is collected in a basin and may be directly applied to plants.

Figure 7 – Litter automatically deposits into pit with the movement of pigs in pen.



(2) Collection

Swine manure can be collected by scraping or flushing. Scraped manure is collected as a solid or slurry, and flushed manure must be handled as a liquid. The flush water should be recycled if possible so the volume of contaminated water is kept to a minimum. The collection process can use automated equipment, or it can be as simple as raising swine on slatted floors over waste storage pits (Figure 8).

Figure 8 - Confined housing with farrowing crates, partly slatted floor, pit storage, and liquid manure handling. Waste is pump out of pits and transferred to storage or applied to plants.

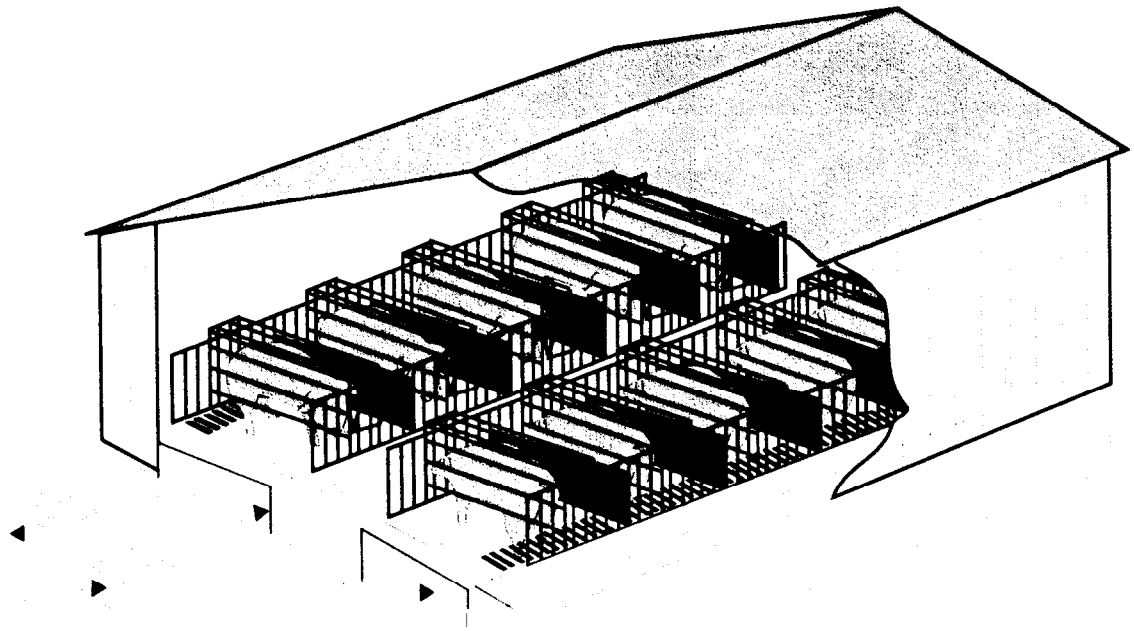
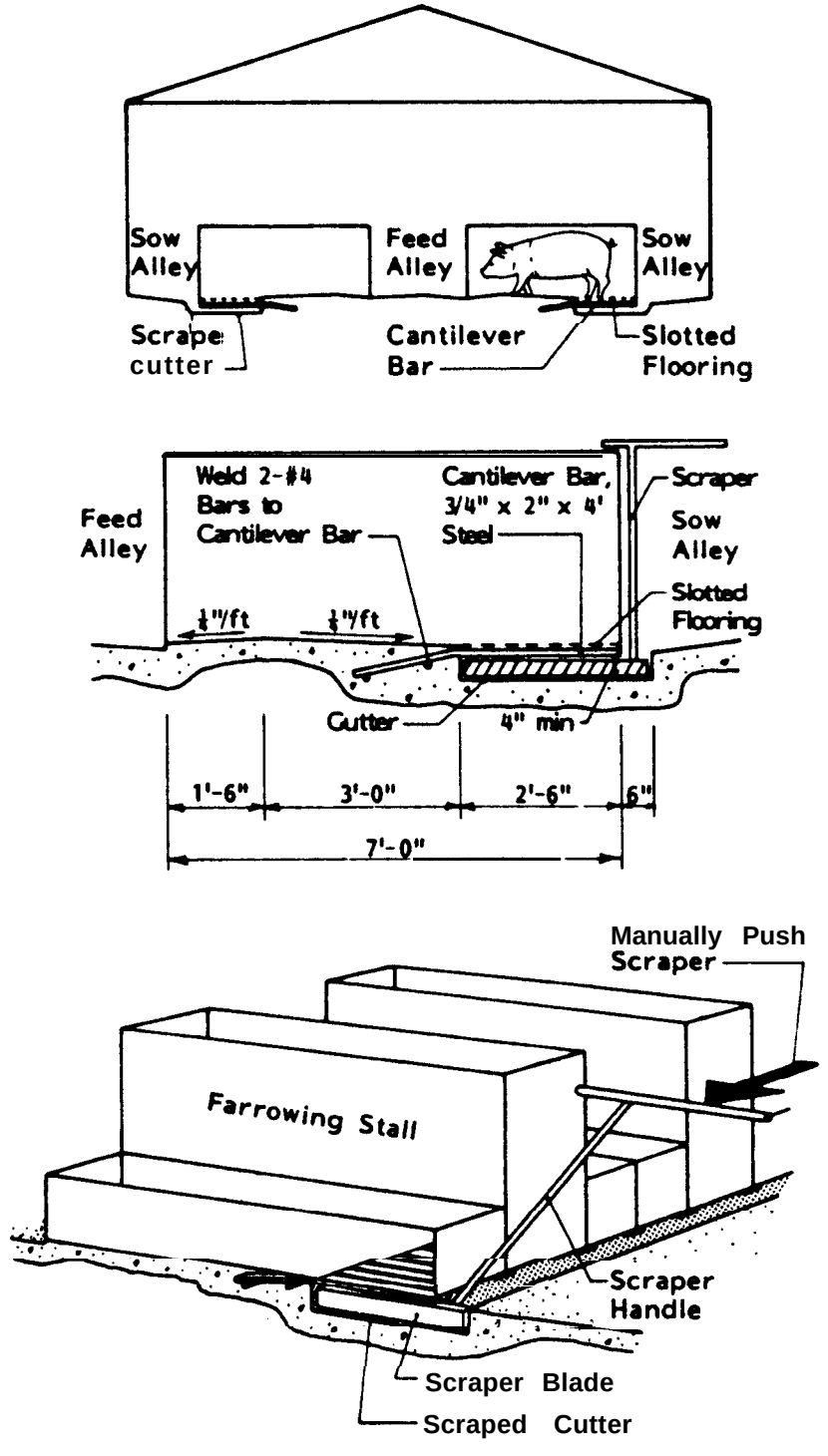


Figure 9 - Shallow manual scrape gutters work well for smaller operations. Hand scrape the manure directly outside into a sump. The gutter should be scraped every day to control odors.



(3) Storage

Swine manure can be stored as a solid, slurry, or liquid. If stored as a solid, it should be protected from rain. Above or below ground tanks (Figure 10) or an earthen waste storage pond (Figure 11) can be used to store slurries or liquid waste.

Figure 10 - Hogs fed in confined area with concrete floor and tank storage for liquid manure handling. Liquids are removed from tanks by pumping.

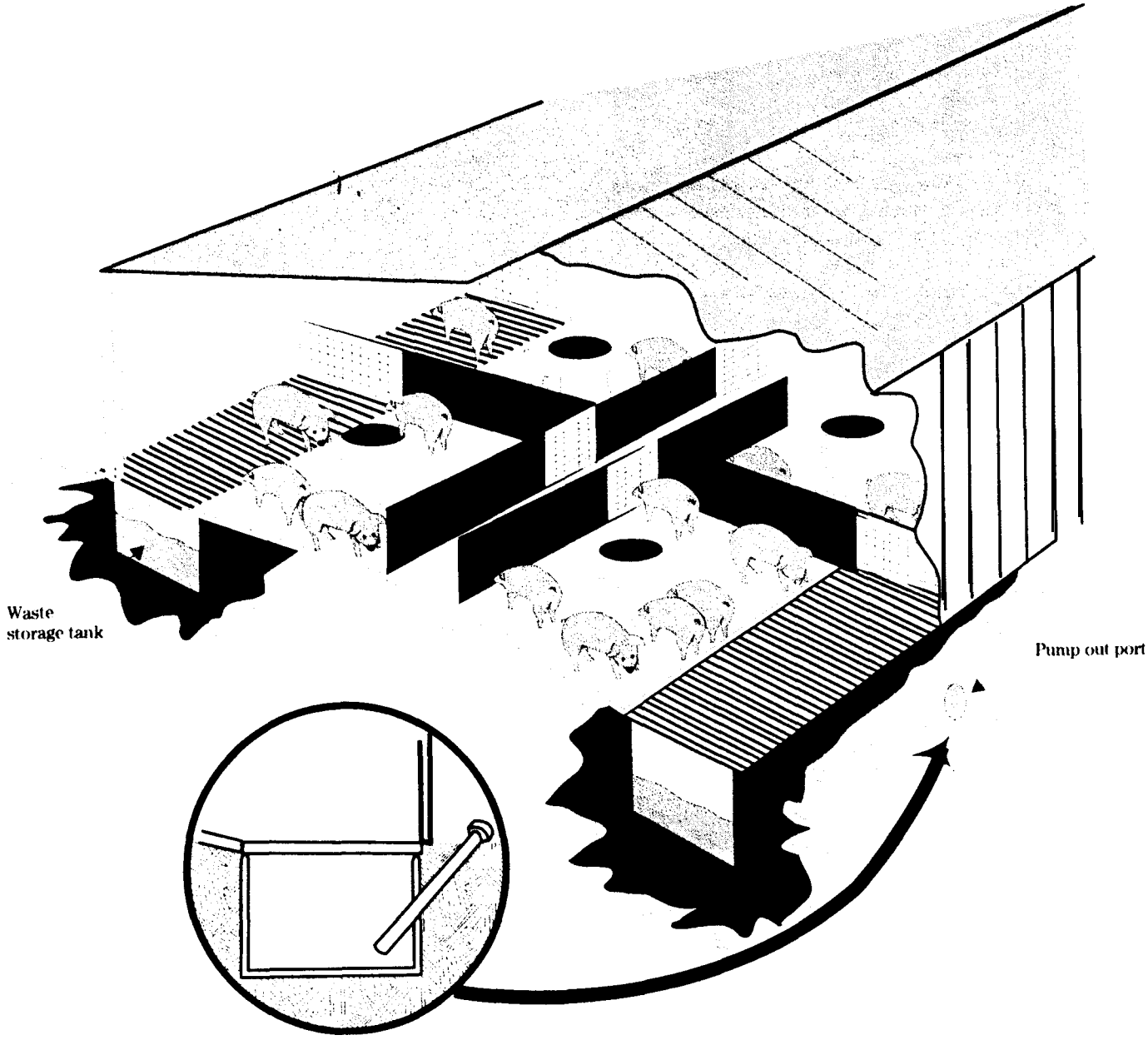
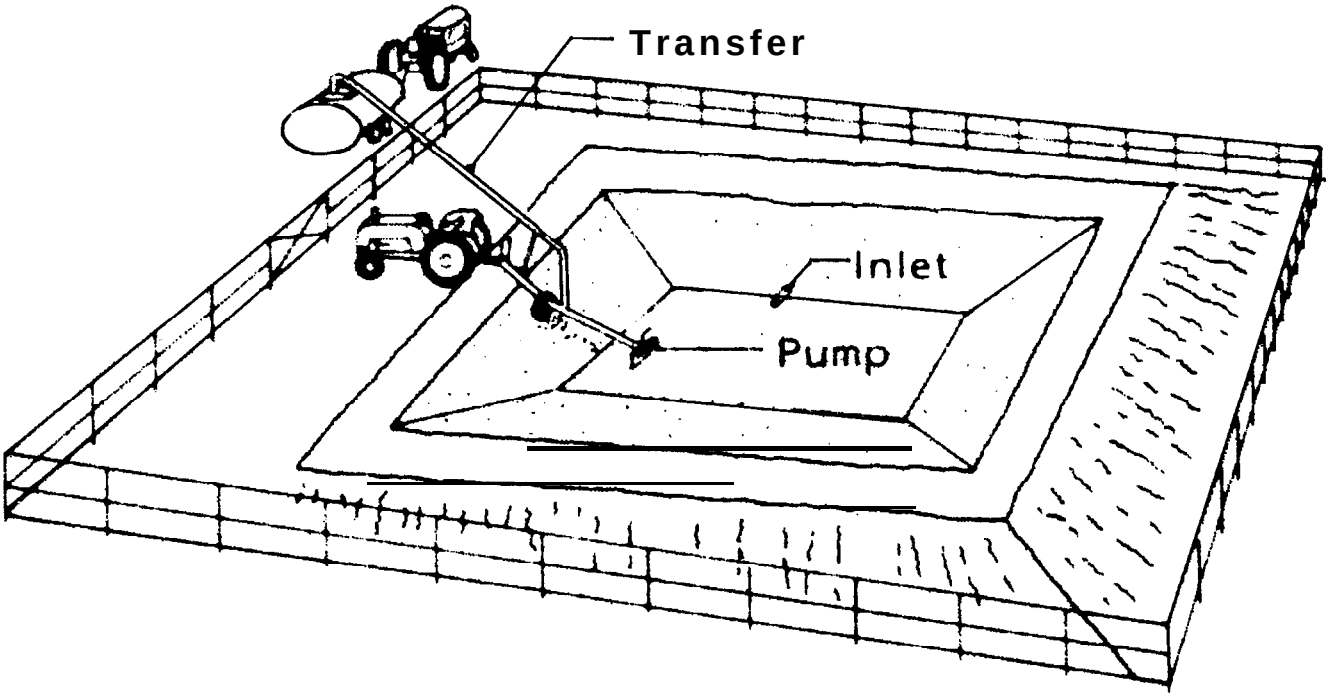


Figure 11 - Earth ponds provide for long term storage. A diversion prevents runoff from entering the pond. All waste ponds and lagoons shall have a fence around the entire structure.



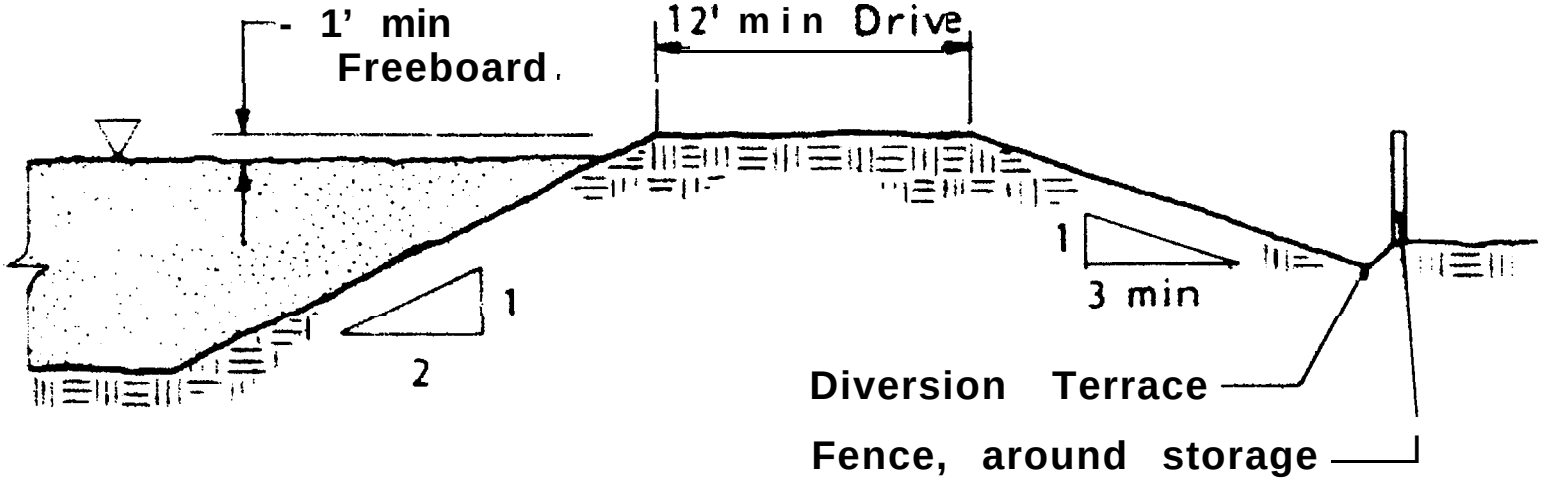


Figure 12 - Agitate prior to pump-out to mix liquids and solids and to break up the crust. A high volume chopper-type, liquid manure pump is best for agitation. Pumps and agitators on floats are also used to clean out earth ponds.

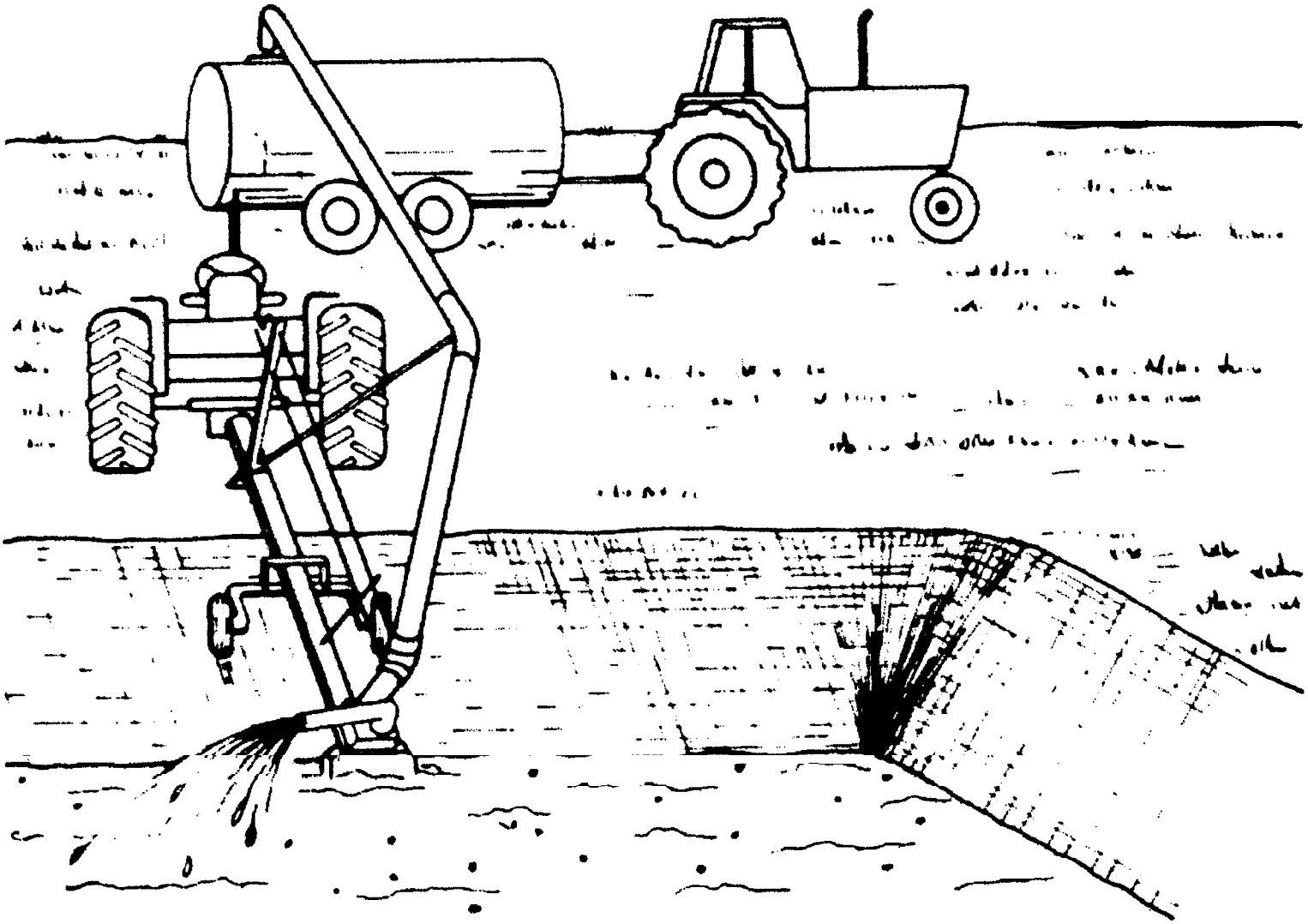
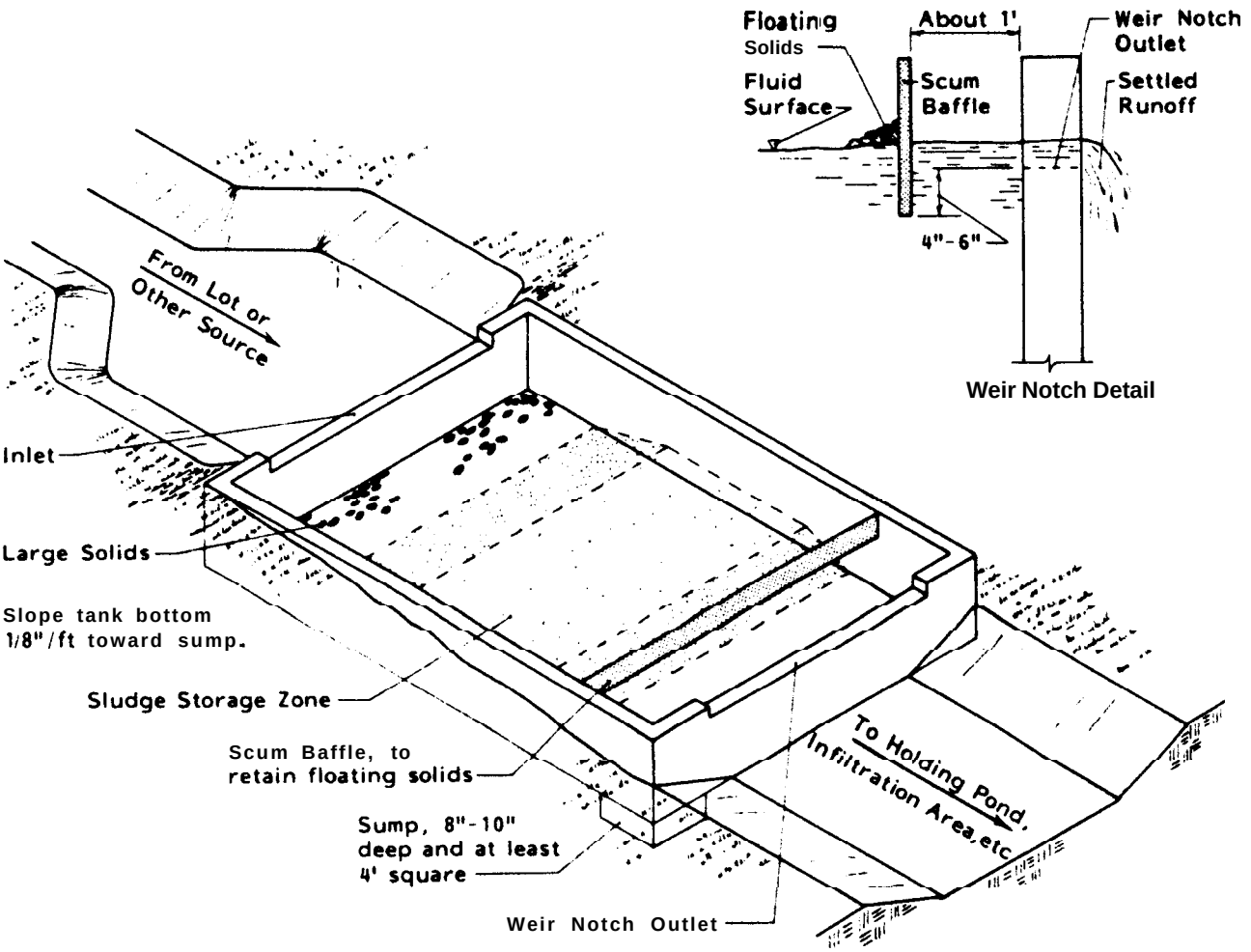


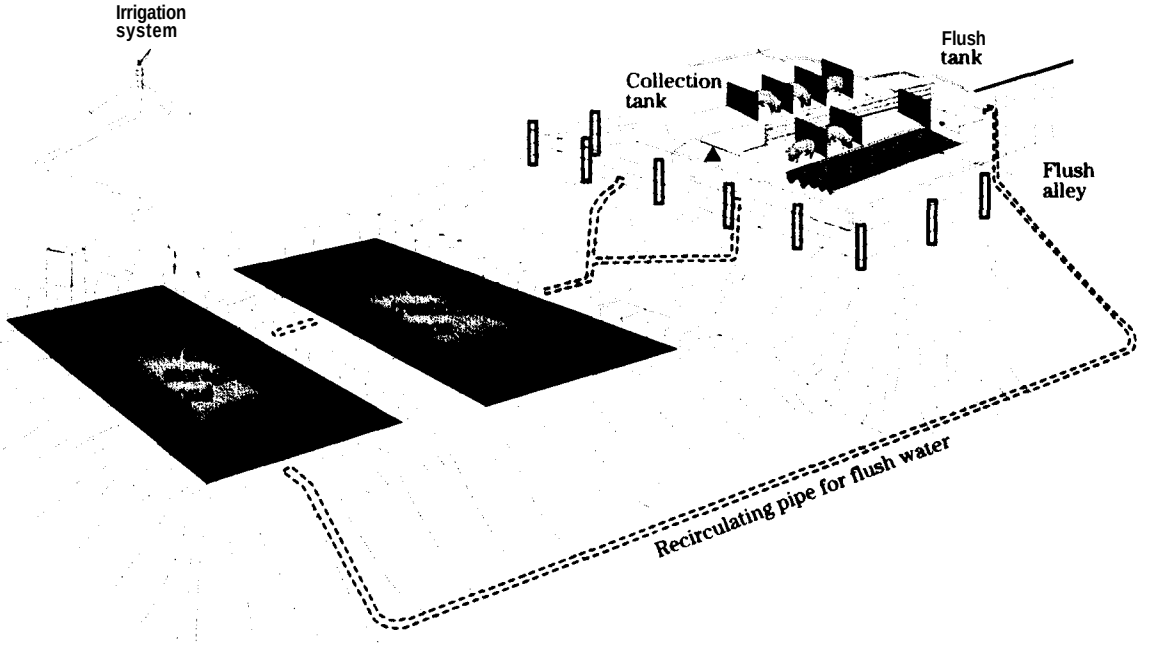
Figure 13 - Concrete settling tank. A settling tank is installed between the flushing building and waste pond or milk-house. The tank is normally full of liquid, so the waste is handled as a semi-solid. It must be cleaned often to be effective. Solids and liquids are removed by agitation and then pumped out.



(4) Treatment

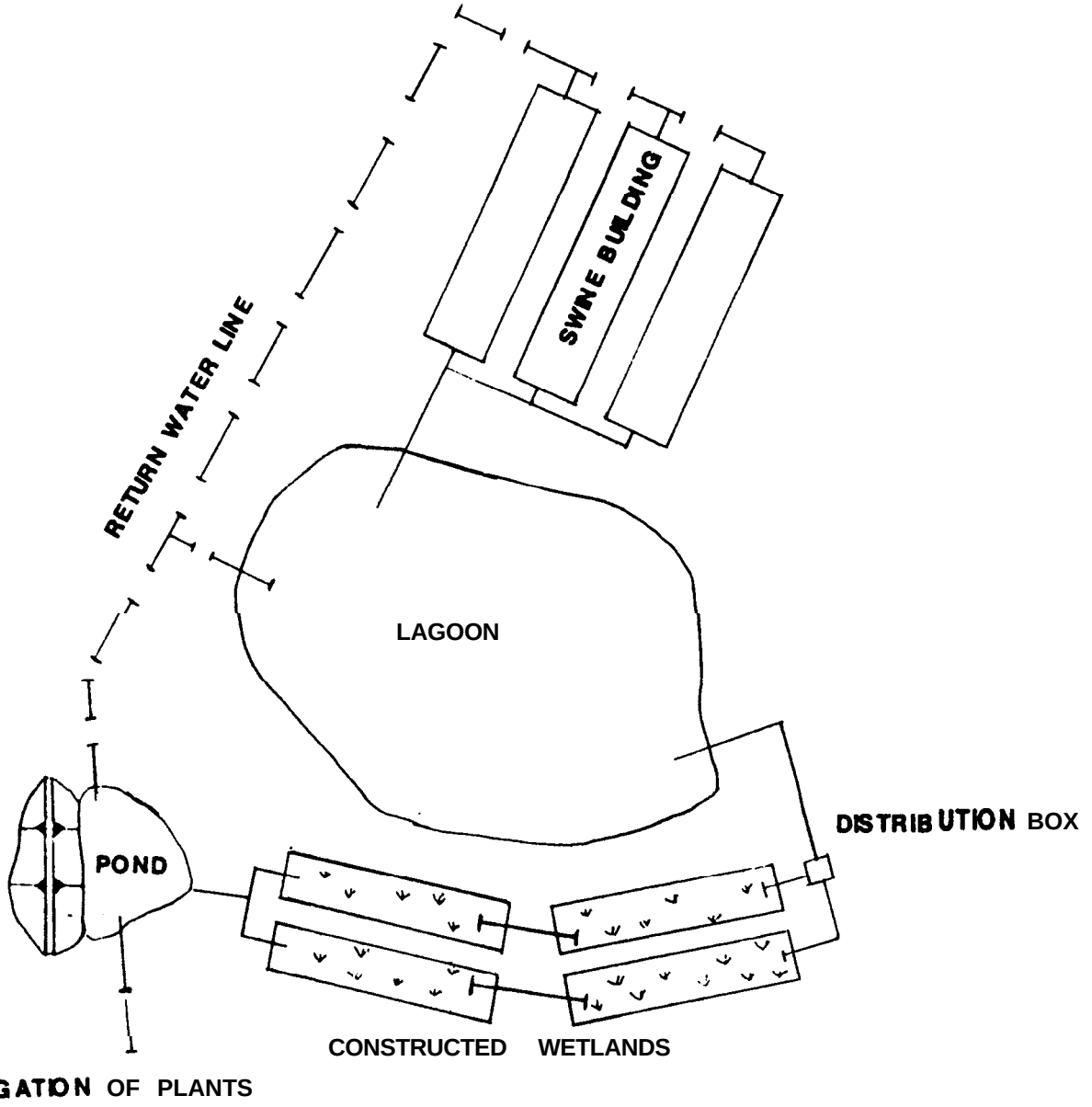
Liquid waste from a swine operation is commonly treated in a waste pond. It can also be treated in an anaerobic lagoon (Figure 14) or oxidation ditch. Solid waste can be composted. Dead pigs can be composted or incinerated.

Figure 14 - Two stage waste pond system for treatment of waste flushed from swine building. The first pond serves to treat or liquefy the manure. The second pond effluent that is lower in solids and nutrient content can be recirculated for flushing or disposed of with an irrigation system.



Liquid waste may be purified further with a secondary lagoon, constructed wetlands or by biological methods. Most solids and pathogens settle out in the primary lagoon. The constructed wetlands remove suspended solids, nutrients, and metals as the water flows through (Figure 15). Less land area will be used to spread the waste water with the reduction in nutrients.

Figure 15 - Constructed wetlands used to further reduce nutrient levels in waste water. Water is returned to buildings for flushing or used to irrigate plants.



(5) Transfer

The method used to transfer the waste depends largely on the consistency of the waste. Liquid waste and slurries may be transferred through open channels, pipes, or in a portable liquid tank. Pumps can transfer liquid waste as needed. Solids and semi-solids can be transferred by mechanical conveyance equipment.

(6) Utilization

The most common use of the nutrients in swine waste is through land application. Swine waste may also be used as a feed supplement.

The waste can be hauled and distributed over the land by spreading devices. If odors are a problem, liquid waste can be injected below the soil surface (Figure 16). Liquids and slurries can also be distributed through an irrigation system (Figure 17).

With proper ventilation and sufficient bedding, the solid manure can be composted in confinement facilities.

Figure 16 - Subsurface injection of manure prevents runoff of manure, reduces odor, and meets the proper nutrient application rates.

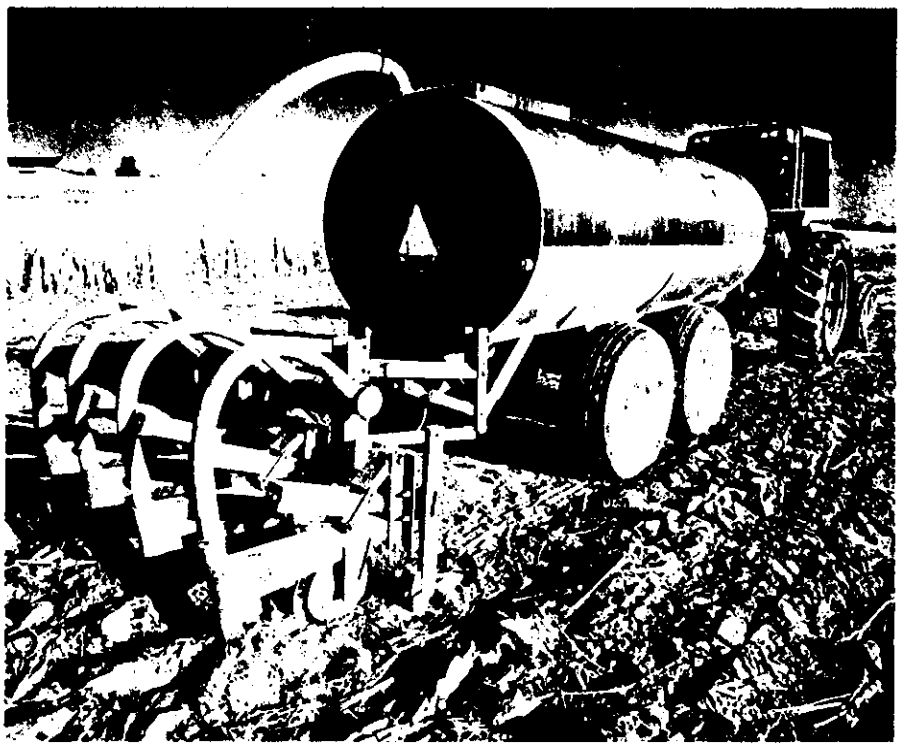
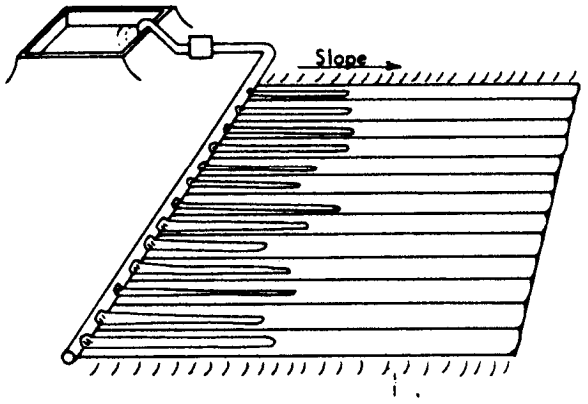
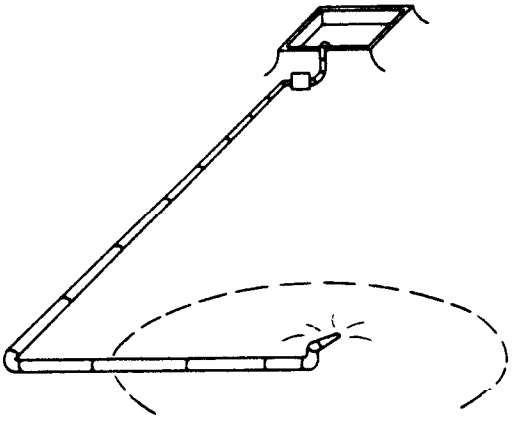


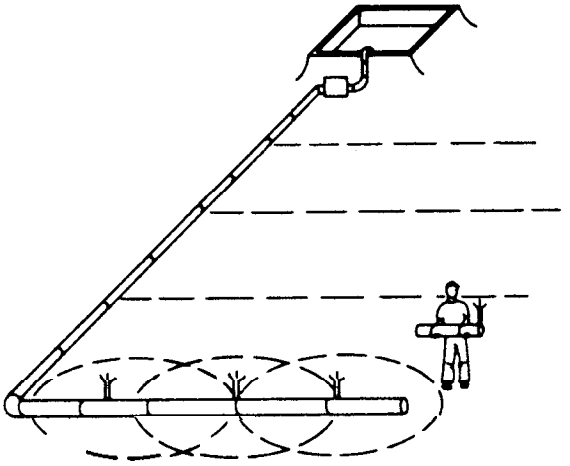
Figure 17 - Various types of irrigation systems to spread liquid waste water.



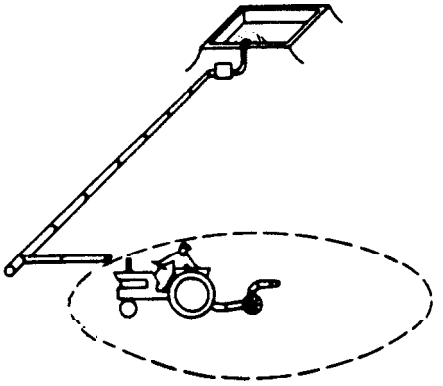
Surface system.



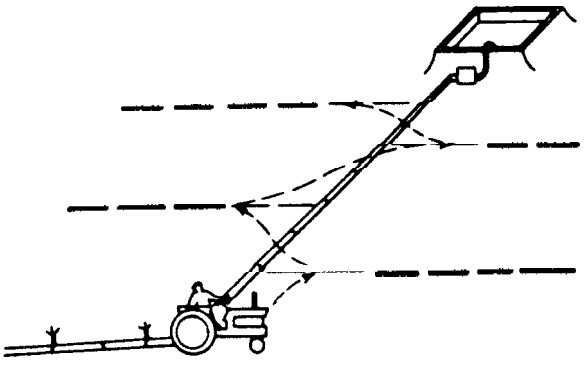
Stationary big gun.



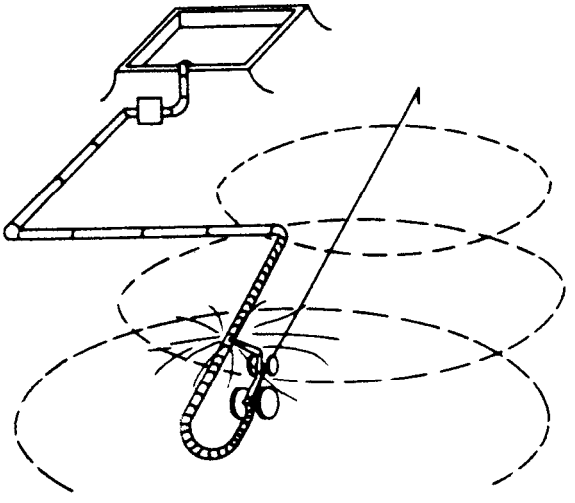
Handmove system.



lowed big gun.



Towline system.



Traveling big gun.

(7) Example

A waste pond should have sufficient storage for the period between clean outs. The stored volume includes:

1. Accumulated solids for the period between removal;
2. Manure, clean water, runoff, and waste water;
3. Normal rainfall less evaporation;
4. The 25 year-24 hour rainfall.

The length of storage selected may be based on the consecutive number of wet months, available area for the pond, available fields for waste disposal, available time for operation and maintenance, available equipment, and management requirements.

Land area needed for disposal is directly related to the treatment applied to the manure, soil, plants, and climatic conditions. The application of waste in the field should not exceed the plant nutrient and water needs.

A swine operation has 40 sows and 400 growers. Pens are washed with hoses. An average of 7 gal/pig/day of water is used. Swine produce about 1.2 gallons of manure per day.

A waste pond for this operation will have a storage of approximately 110,000 gallons/month for just the wash water and manure produced. Additional storage volume is added for normal monthly rainfall and the 25 year storm.

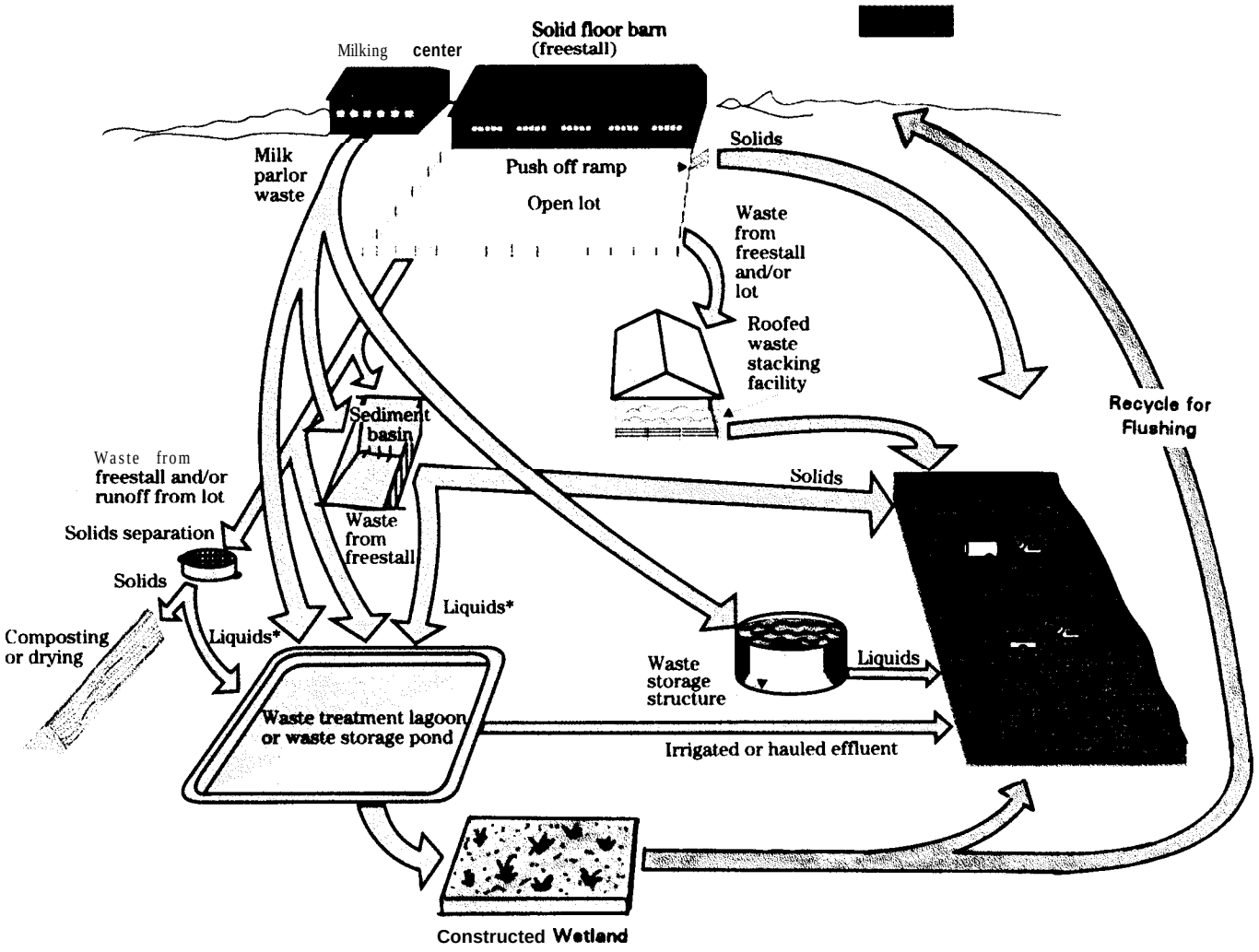
Manure from the pens that is applied directly to the fields will require 12 acres of pasture per year for disposal. The manure has not been treated and contains a high amount of nutrients. A large area is needed to apply the nutrients at the grass nutrient use rate.

Manure treated in a waste pond could be spread over 3 acres of pasture/year for disposal. Nutrients in the manure are reduced through bacteria and biological action. Therefore, less land area is needed to dispose of the manure.

Manure treated in a waste pond and constructed wetland before application may need 0.6 acres of pasture a year for disposal. The water may also be recycled as wash water in the pens. Another 0.5 acres is needed for the constructed wetlands. The pond and constructed wetland provide two treatments to the manure. This reduces the nutrient content significantly and less land area is needed for disposal. The area used by the constructed wetland is less than the land area needed to spread manure that has received only one treatment.

DAIRY WASTE HANDLING COMPONENTS

Figure 18 - Dairy waste handling options

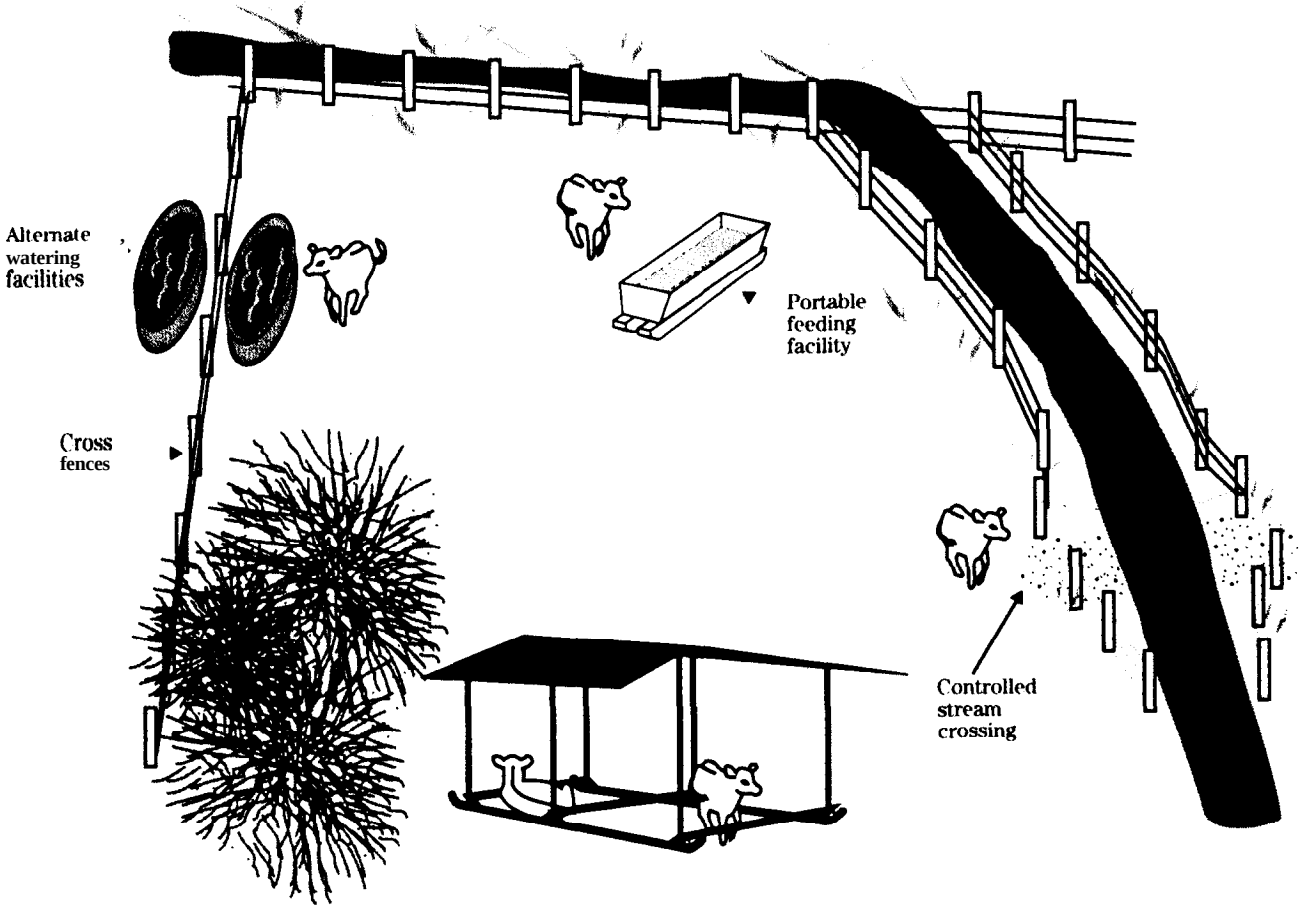


Dairy operations require high standards of sanitation and must prevent problems associated with flies.

Dairy animals are typically managed in partial confinement. While animals are on pasture, their waste should not be a resource concern if stocking rates are not excessive, grazing is evenly distributed, manure from other sources is not applied, and grazing is not allowed during rainy periods when the soil is saturated.

To prevent waste from accumulating in feeding, watering, and shade areas, the feeding facilities can be moved, the number of watering facilities increased, and the livestock can be rotated between pastures. To reduce deposition of waste in stream beds, access to the stream may be restricted to stable stream crossings and access points (Figure 19).

Figure 19 - Livestock waste management on pasture includes cross fences for rotation, portable feeding facilities, shade areas away from streams, alternate water facilities, and controlled stream crossing.



Generally, the manure in paved holding areas is easier to manage and easier to keep clean. If the holding areas are unpaved, the traffic of the livestock tends to form a seal on the soil that prevents the downward movement of contaminated water. Care must be taken when removing manure from these lots so that damage to this seal is minimized.

(1) Production

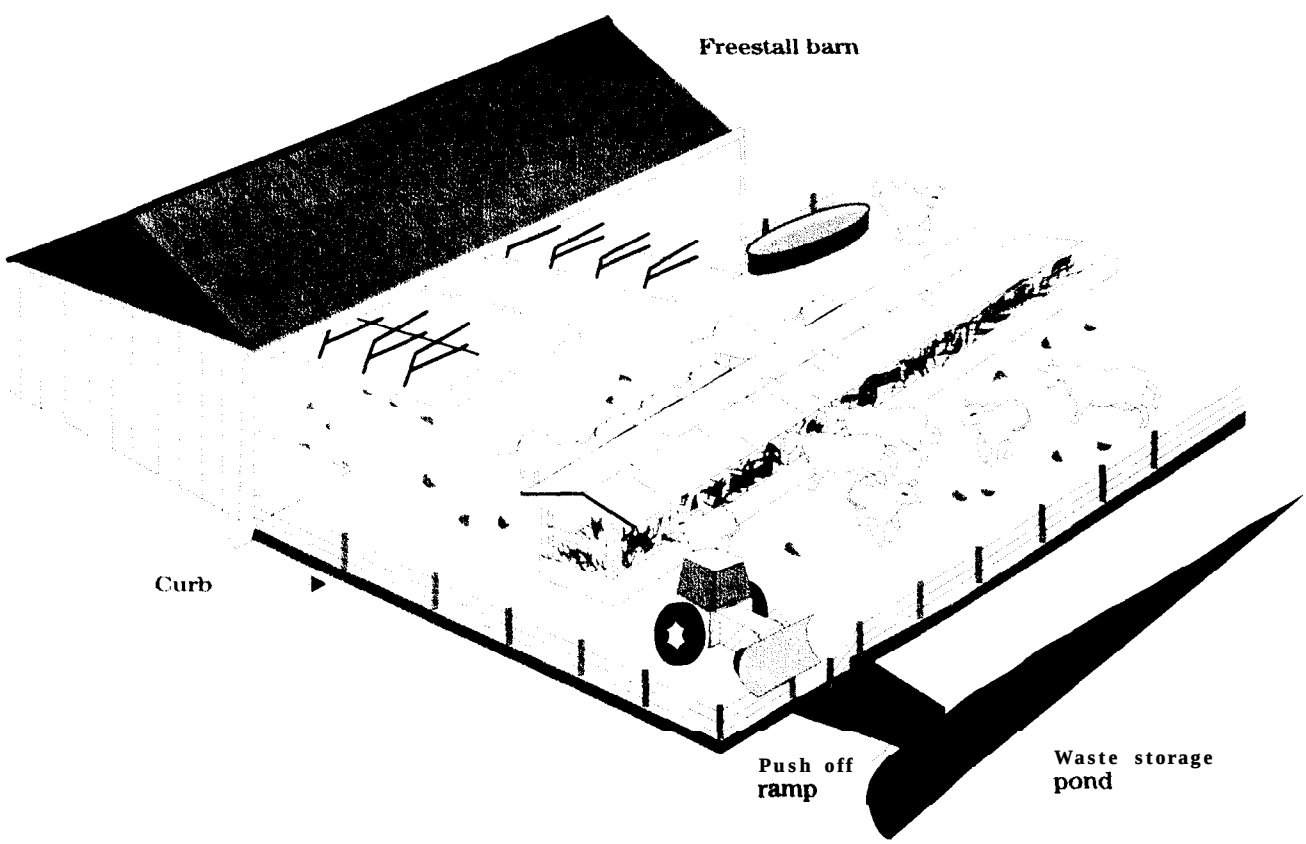
Waste associated with dairy operations includes manure, contaminated runoff, milking house waste, bedding, and spilled feed.

(2) Collection

The collection methods for dairy waste vary depending on the management of the dairy operation. Dairy animals may be partly, totally, or seasonally confined. Manure accumulates in confinement areas and in areas where the dairy animals are concentrated before and after milking.

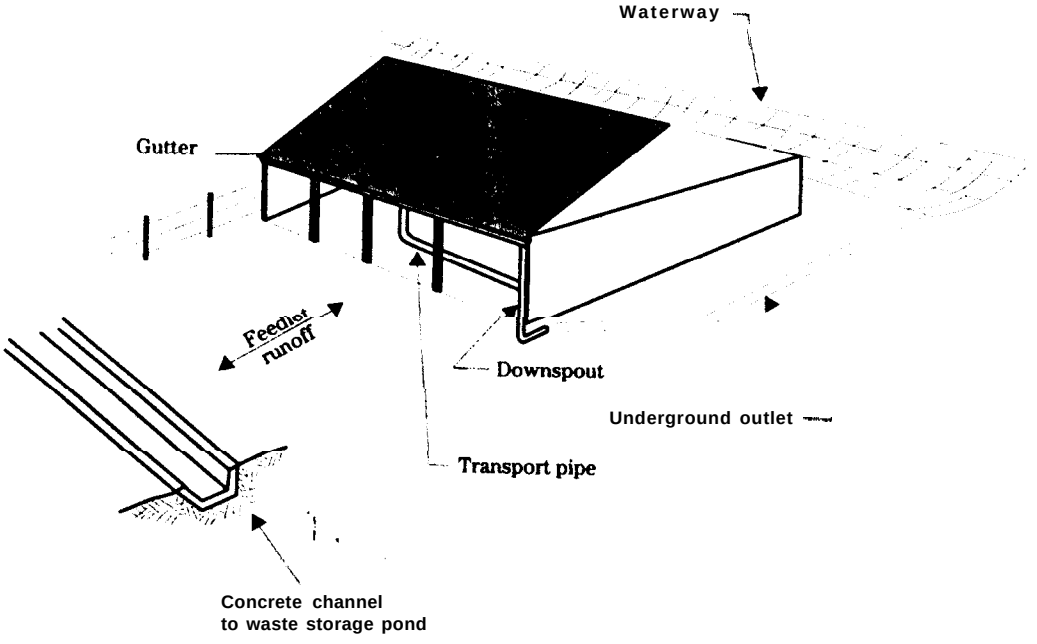
Unroofed confinement areas must have a system for collecting and confining contaminated runoff. This can be accomplished by using curbs at the edge of the paved lots (Figure 20) and reception pits where the runoff exits the lots.

Figure 20 - Open confinement area with curbing. Curbing diverts runoff water into waste storage pond.



Runoff may be controlled by diversions, sediment basins, and underground outlets. The volume of runoff may be reduced by diverting uncontaminated water, reducing the confinement area, and installing gutters on roofs (Figure 21).

Figure 21 - Clean water is separated from contaminated water. Roof gutter empties into waterway to reduce the volume flowing into the waste pond. Contaminated runoff discharges into waste storage pond.



The manure and associated bedding in roofed confinement areas can be collected and stored as a solid. The manure can also be collected as a solid in unroofed lots where the manure is removed daily.

Manure can be removed from paved areas by a flushing system (Figure 22). Flush alleys should be cleaned at least twice a day. The volume of contaminated water can be greatly reduced if provisions are made to recycle the flush water.

Figure 22 - Free-stall barn with flushing alleyway. Treated water is recycled for flushing or used to irrigate plants.

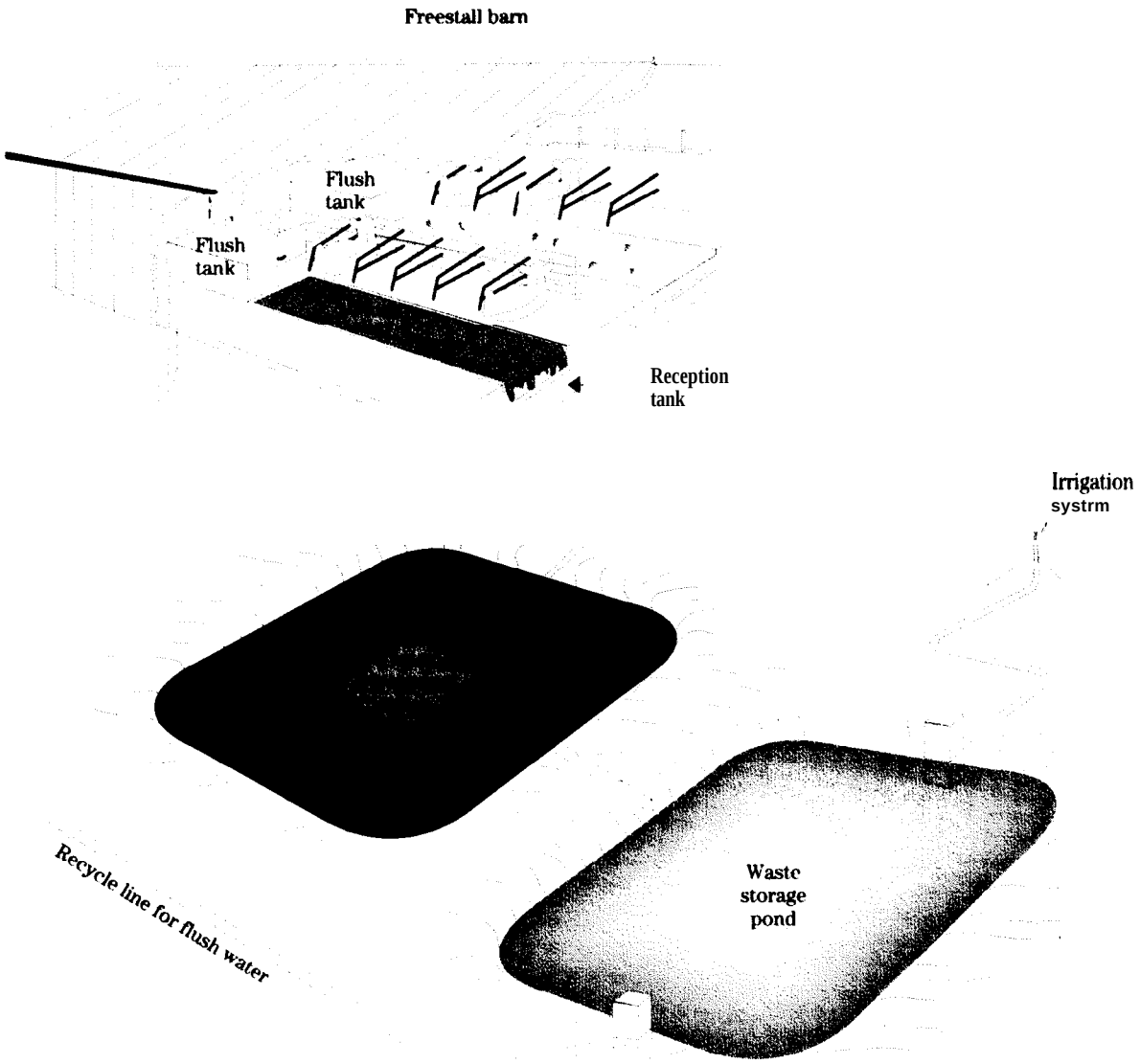
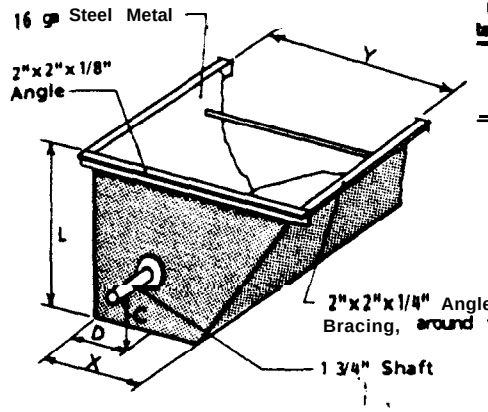
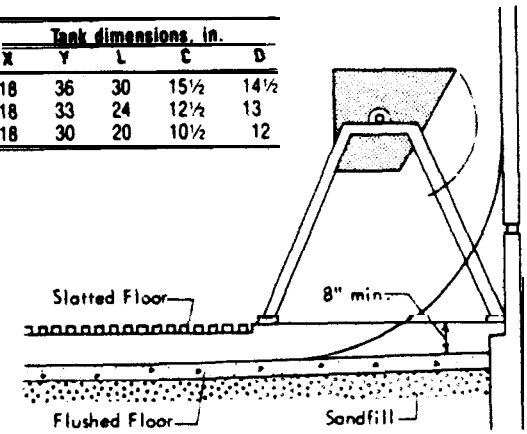


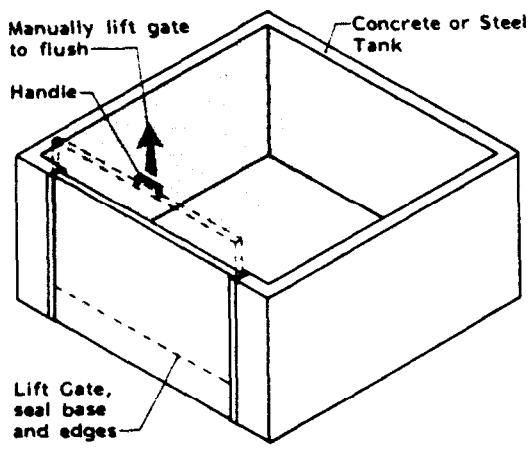
Figure 23 - Automatic and manual flush tanks used in dairy and swine operations.



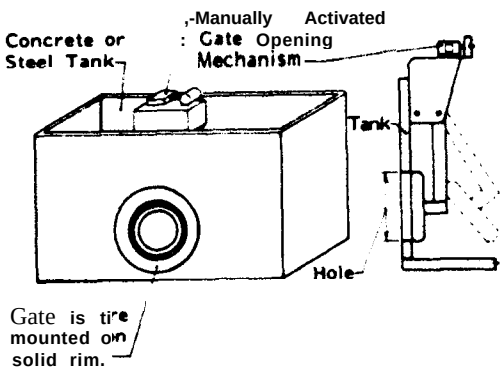
Gal/ft of tank length	Tank dimensions, in.				
	X	Y	L	C	D
40	18	36	30	15½	14½
30	18	33	24	12½	13
24	18	30	20	10½	12



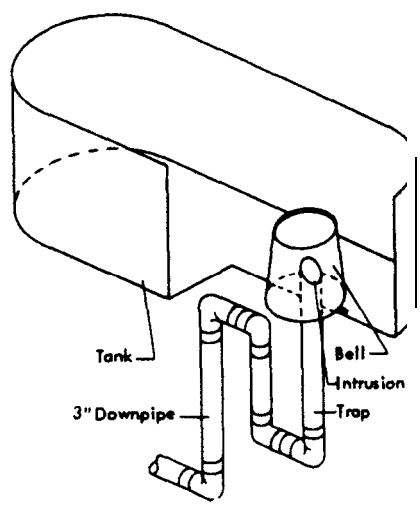
Tipping tank.



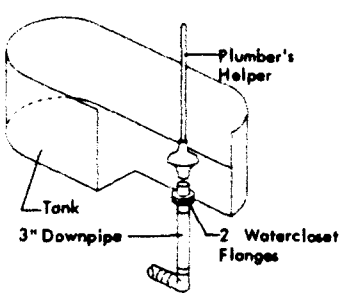
Lift or hinge gate tank.
Tank with alley width front opening that can be fitted with a lift gate, as shown, or a hinged drop gate.



Tank with circular flush gate.



Automatic siphon tank.



Manual flush tank.

Two kinds of manure scrapers are used to clean alleys. A mechanical scraper using electrical drives attached by cables or chains is dedicated to each alley. A tractor scraper can be used in irregularly shaped alleys and open areas.

Figure 24 - Alleys are scraped clean. Waste is stored in an above ground tank. Waste is transported by a covered wagon.

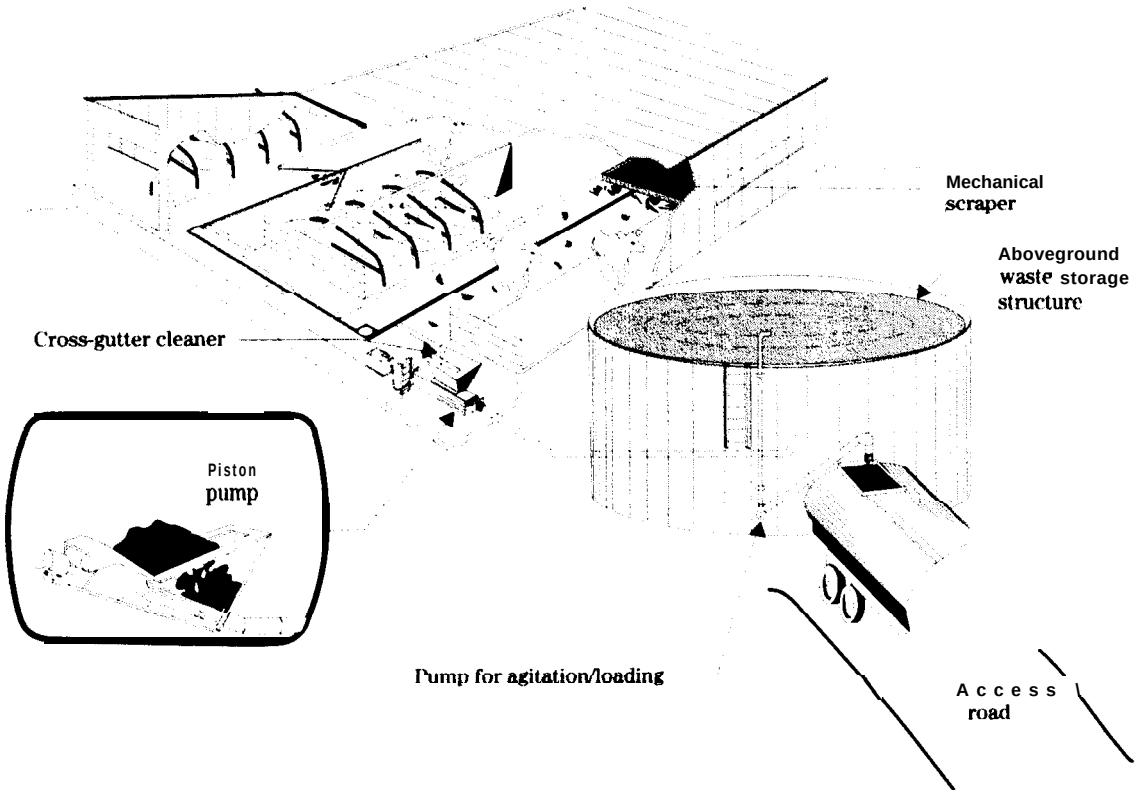
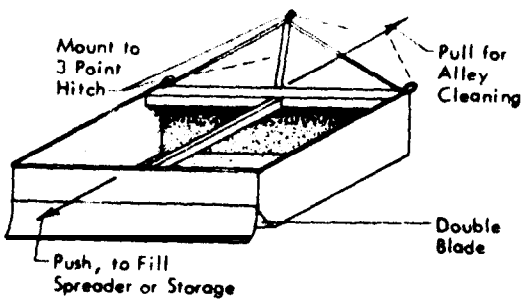
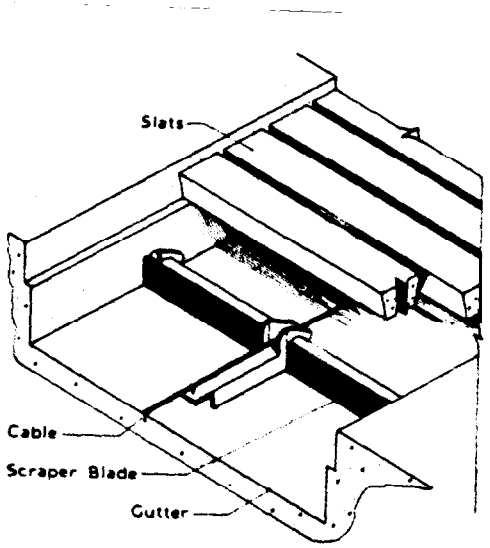


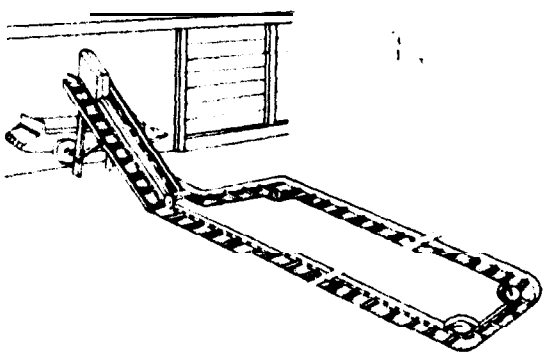
Figure 25 - Examples of manure scrapers.



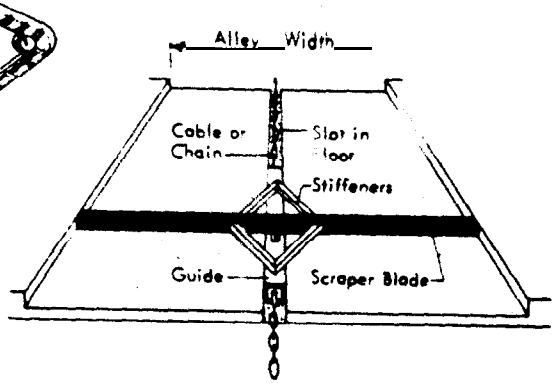
Tractor-mounted scraper.



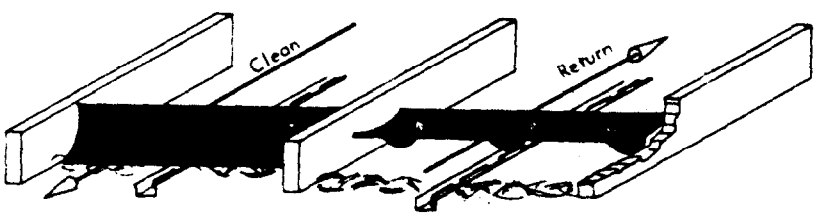
Typical underslat scraper system.



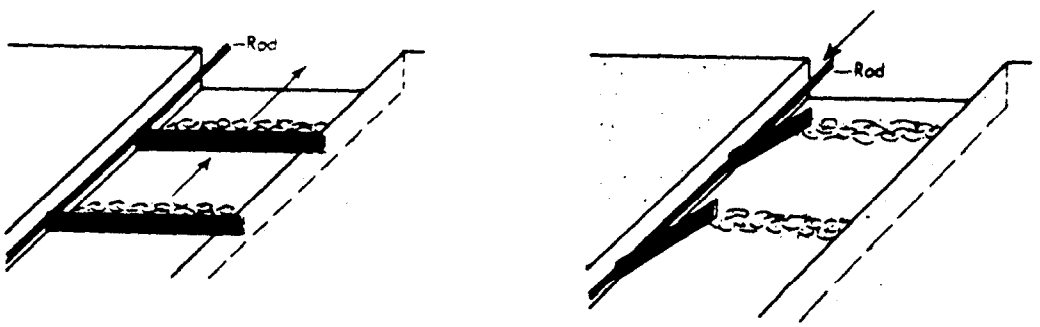
Barn cleaner.



Two-way rigid scraper.



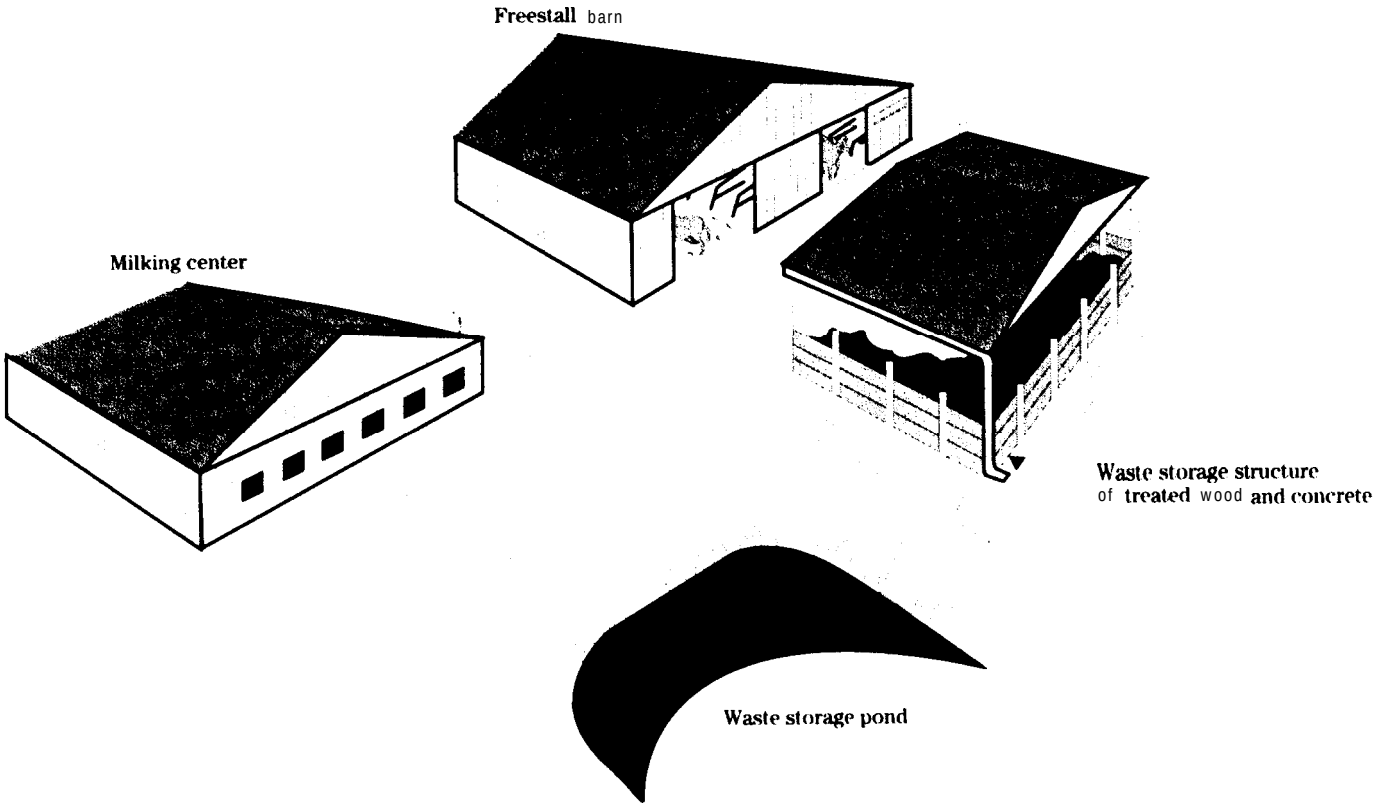
Push-pull alley scraper.
Many types are available, operated with rods, bars, cables, or chains.



Shuttle-stroke open gutter cleaner.

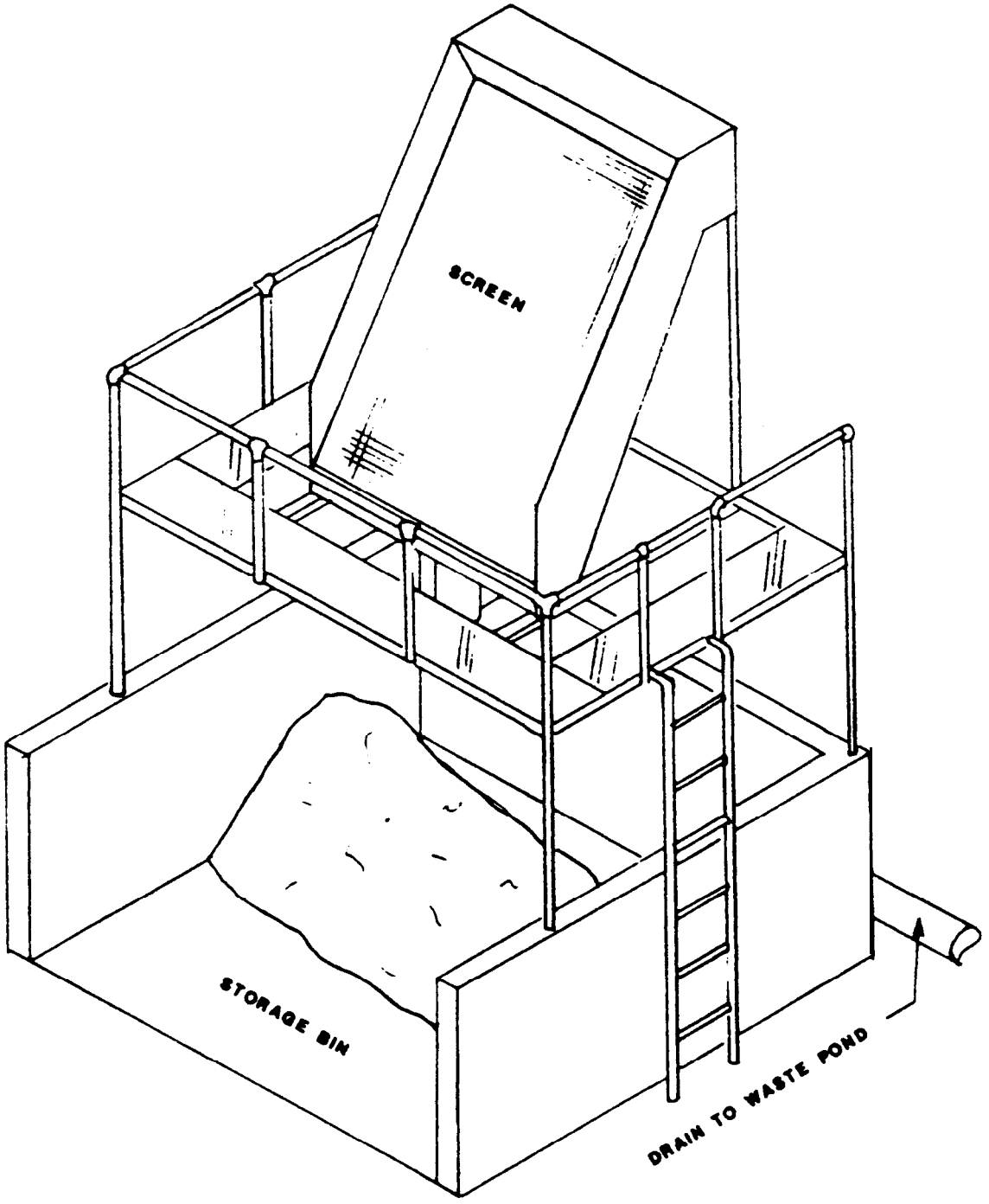
(3) Storage

Figure 26 - Milking house waste, manure, and contaminated runoff must be stored in a waste storage pond or tank. Solid waste is stored in a stacking facility with drainage outlet. Roof gutters help in keeping material dry. Manure can be stored in an unroofed structure that allows for the drainage of excess water and runoff.



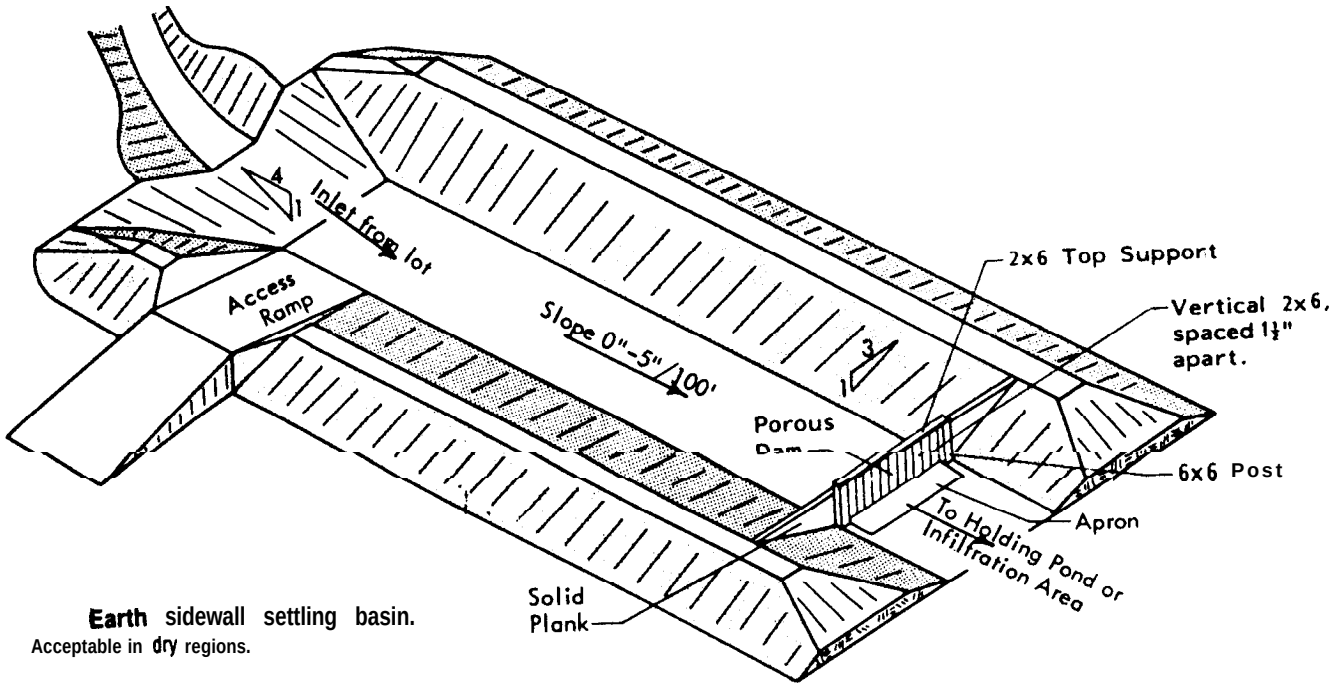
Separating solids and liquids will facilitate the handling of manure. Separation eliminates many of the problems associated with the introduction of solids into waste storage ponds. Mechanical separators with screens are commonly used to recover the solids.

Figure 27 - Mechanical screen separator. Waste water and solids flow over screen. Water passes through screen and solids are trapped on screen. Solids slide down the screen and accumulate under separator. Liquids are discharged to a pond.

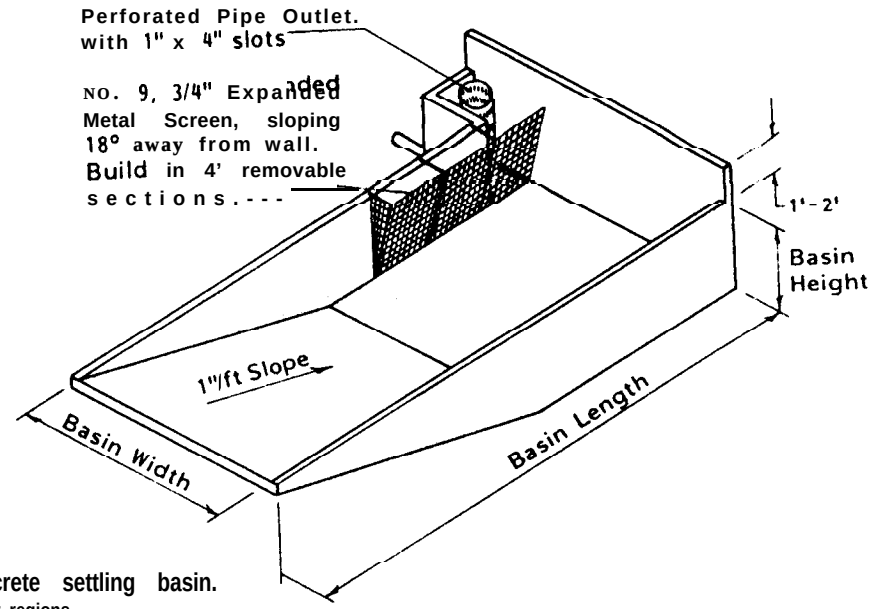


Settling, or solid separation basin, is a common device to remove solids, soil, and other material from livestock operations. It is positioned between the waste source and the waste storage or treatment facility.

Figure 28 - Settling basins may be of earthen or concrete construction. Solids remain in the basin and require periodic cleaning. Liquids are discharged to a pond or other storage facility.



Earth sidewall settling basin.
Acceptable in dry regions.



Concrete settling basin.
Use in wetter regions.

(4) Treatment

Liquid waste can be treated in a waste storage pond, anaerobic lagoon, or other suitable liquid waste treatment facility. Solids in the waste can be composted.

Liquid waste may be purified further with a secondary lagoon, constructed wetlands or other biological methods. Most solids and pathogens settle out in the primary lagoon. Constructed wetlands remove suspended solids, nutrients, and metals as the water flows through. Less land area will be used to spread the waste water with the reduction in nutrients.

A dairy loafing lot rotational management system will reduce the common problems associated with loafing lots (Figure 29). Several of the problems are: (1) surface runoff and soil erosion; (2) reproductive infections due to the muddy area; (3) and udder infections.

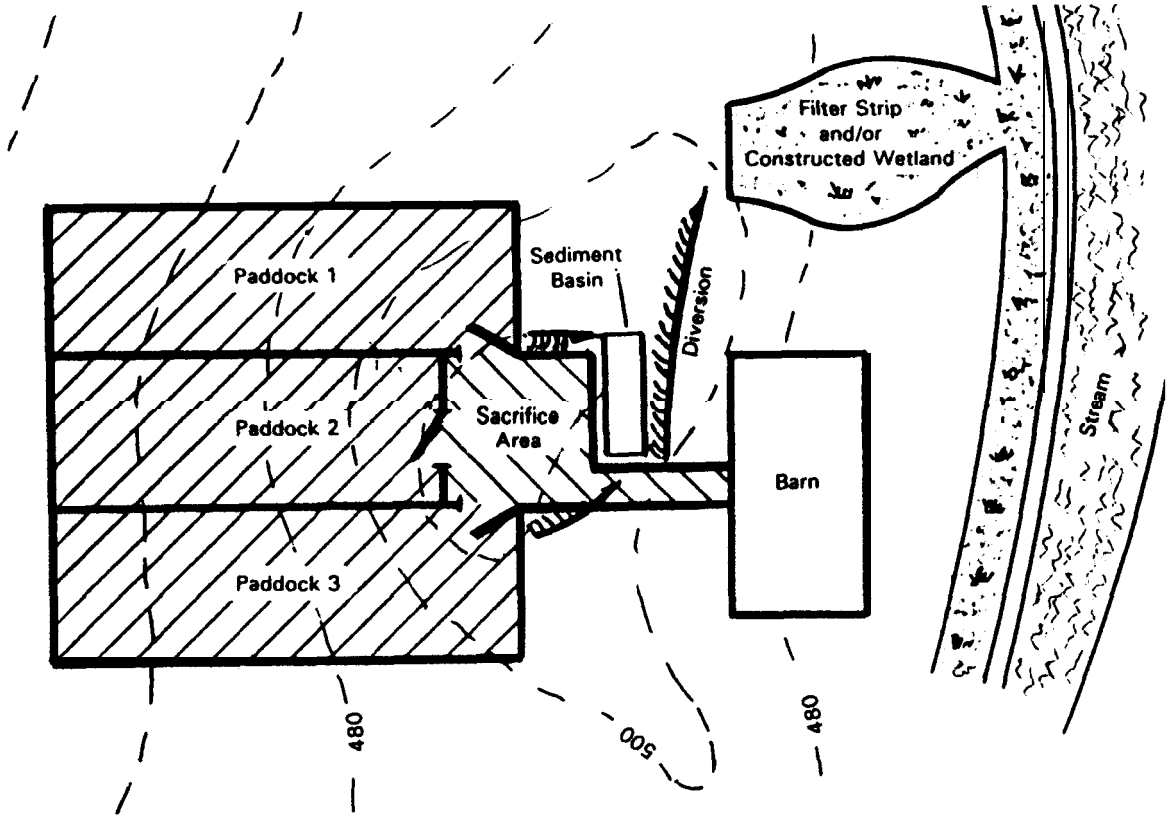
The system involves rotating the lactating herd from one grass paddock to another or the sacrifice area, depending upon vegetative growth and soil moisture conditions. During wet or poor grass cover periods, cows are placed in the sacrifice area or barn to avoid destroying the paddock sod.

Since the paddocks are not for grazing, cows should have free access to feed bunks and water. Cows may show an interest in grazing the lots, but if fed a balanced ration, they will graze very little.

Due to the grass cover, temperatures will be cooler than bare soil. With less heat stress, milk and fat production will improve. The grass lots reduce time to gather and move cows, and reduce the milking time because of cleaner udders. Paddocks are fertilized and maintained naturally by the herd.

Dry, clean grass-covered lots decrease the risk of udder and reproductive infections, reduce veterinary cost, and help maintain reproductive efficiency.

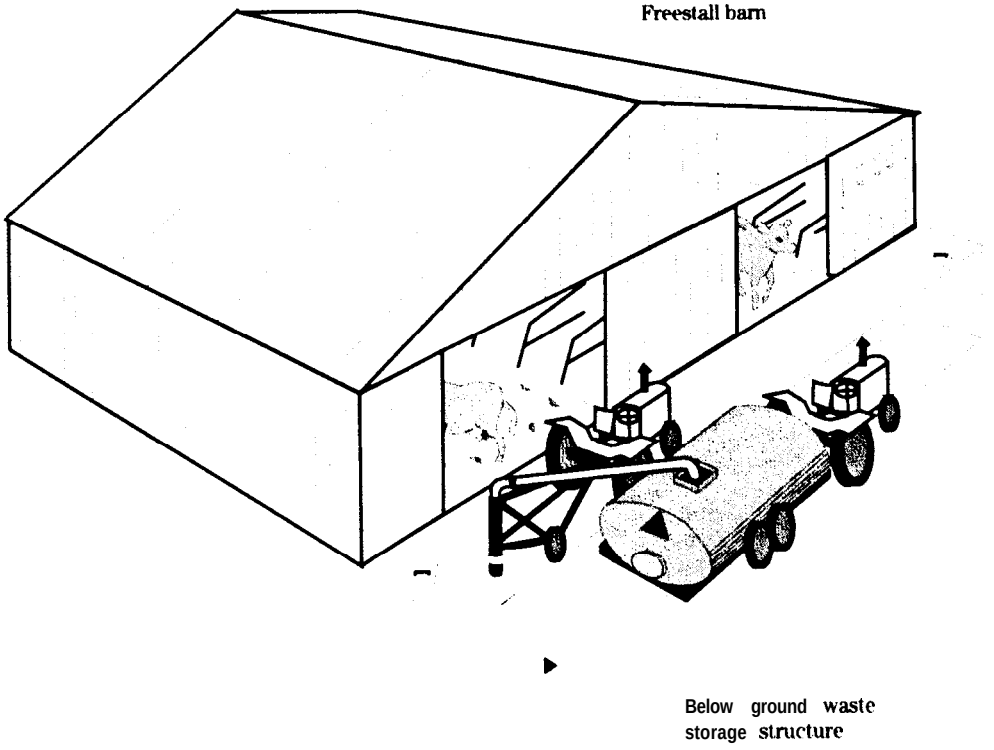
Figure 29 - Dairy loafing lot rotational management system. COWS are rotated between paddocks 1, 2, 3, or the sacrifice area. Grass should be maintained in each paddock. Profits should increase due to clean and healthy cows. Sediment basin and diversion help to control surface runoff.



(5) Transfer

Liquid and slurry can be transferred through open channels, pipes, or in a portable liquid tank (Figure 30). Pumps can be used to transfer liquid waste as needed.

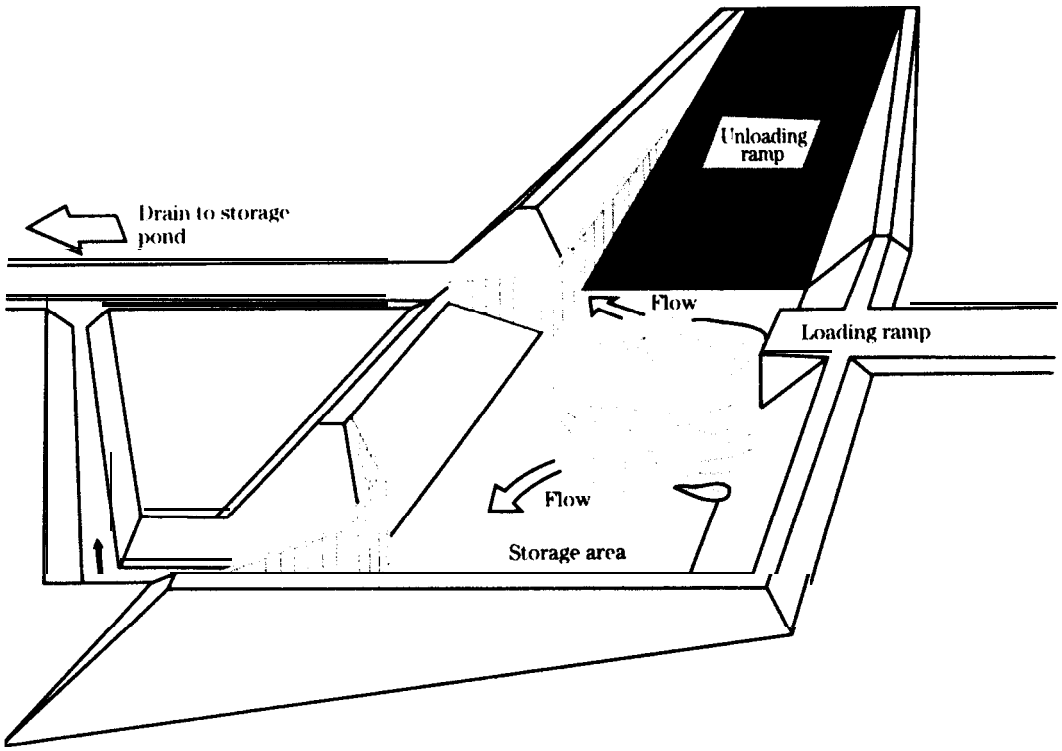
Figure 30 - Tank wagon used to spread liquid waste from below ground storage structure.



Solid and semi-solid waste can be transferred by mechanical conveyance equipment, in solid manure spreaders, and by pushing it down curbed concrete alleys.

Picket dams can be used to drain runoff from the storage area while retaining the solid manure and bedding (Figure 31). Any water drained should be channeled to a waste storage pond. Water will not drain from manure once the manure and water are thoroughly mixed. Picket dams will not remove the water from the liquid manure.

Figure 31 - Solid manure storage with picket dam.



(6) Utilization

The most common form of utilization of dairy waste is through land application. It is also used as bedding for livestock, marketed as compost, and used as an energy source.

Waste may be hauled and distributed over the land in a dry or liquid manure spreader. Liquid waste and slurries can be distributed through an irrigation system (Figure 17).

(7) Example

A waste pond should have sufficient storage for the period between clean outs. The stored volume includes the following:

1. Accumulated solids for the period between removal;
2. Manure, clean water, runoff, and waste water;
3. Normal rainfall less evaporation;
4. The 25 year-24 hour rainfall.

The length of storage selected may be based on the consecutive number of wet months, available area for the pond, available fields for waste disposal, available time for operation and maintenance, available equipment, and management requirements.

Land area needed for disposal is directly related to the treatment applied to the manure, soil, plants, and climatic conditions. The application of waste in the field should not exceed the plant nutrient and water needs.

Dairies with flushing systems use a large amount of water. About 100 gallons/cow/day is needed for cleaning. Manure produced is about 13.5 gallons/cow/day.

A dairy with 300 cows will need a storage of approximately 1,100,000 gallons/month for just the wash water and manure produced. Additional storage volume is added for normal monthly rainfall and the 25 year storm.

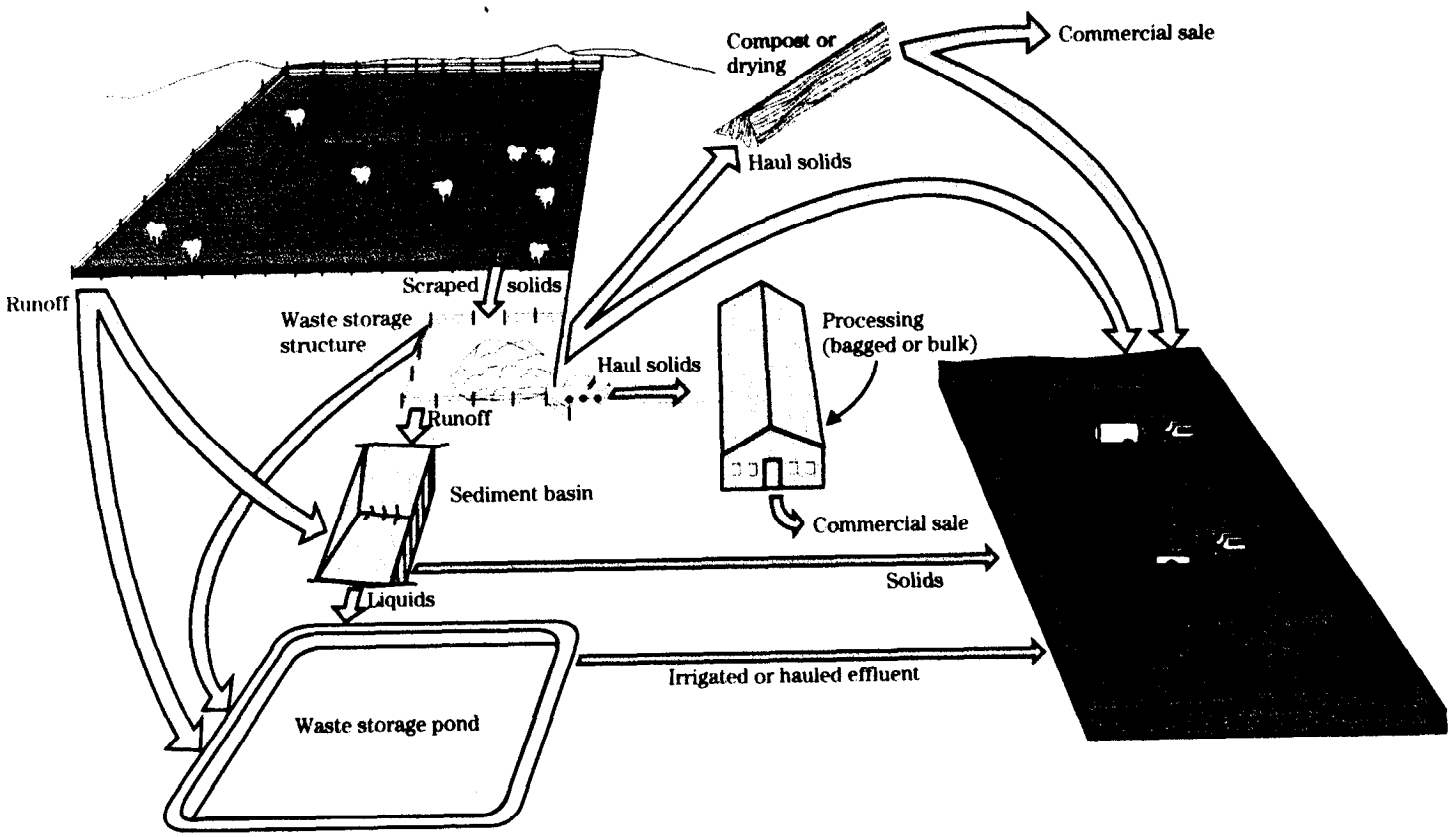
Manure from the barns that is applied directly to the fields may need 65 acres of pasture per year for disposal. The manure has not been treated and contains a high amount of nutrients. A large area is needed to apply the nutrients at the grass nutrient use rate.

Manure treated in a waste pond should be spread over 15 acres of pasture per year for disposal. The nutrients in the manure are reduced through bacteria and biological action in the pond. Therefore, less land area is needed to dispose of the nutrients.

Manure treated in a waste pond and constructed wetland before application may need 5 acres of pasture a year for disposal. The pond and constructed wetland provide two treatments to the manure. This reduces the nutrient content significantly and less land area is needed for disposal. The area used for the constructed wetland is less than the land area needed to spread manure that has received only one treatment.

BEEF WASTE HANDLING COMPONENTS

Figure 32 - Beef Waste Handling Options



Beef brood cows and the calves less than a year old are usually held on pastures or range. The calves are then finished in confined feeding facilities. While the animals are on pastures, their waste should not become a resource concern if the stocking rates are not excessive and the grazing is evenly distributed. To prevent waste from accumulating in feeding, watering, and shade areas, the feeding facilities can be moved, the number of watering facilities can be increased, and the livestock can be rotated among pastures. To reduce deposition of waste in stream beds, access to the stream may be restricted to stable stream crossings and access points. Figure 32 shows a paved beef feedlot operation.

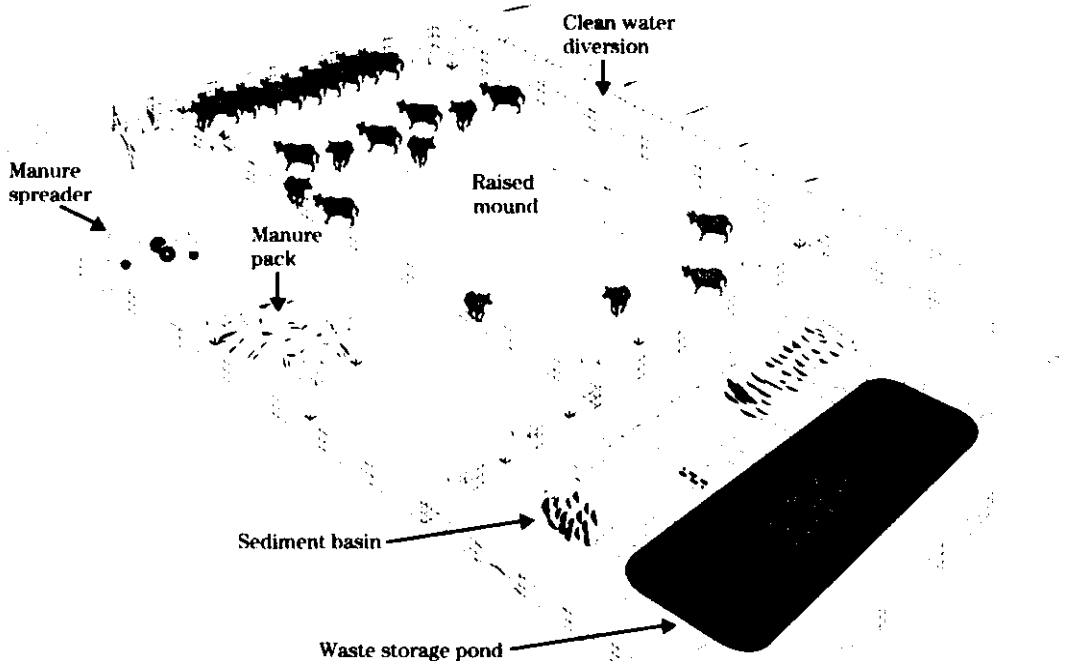
(1) Production

Waste associated with confined beef operations includes manure, bedding, and contaminated runoff.

(2) Collection

Beef cattle can be confined on unpaved (Figure 33), partly paved, or totally paved lots. Because much of the waste is deposited around watering and feeding facilities, paving these areas, which allows frequent scraping, may be desirable.

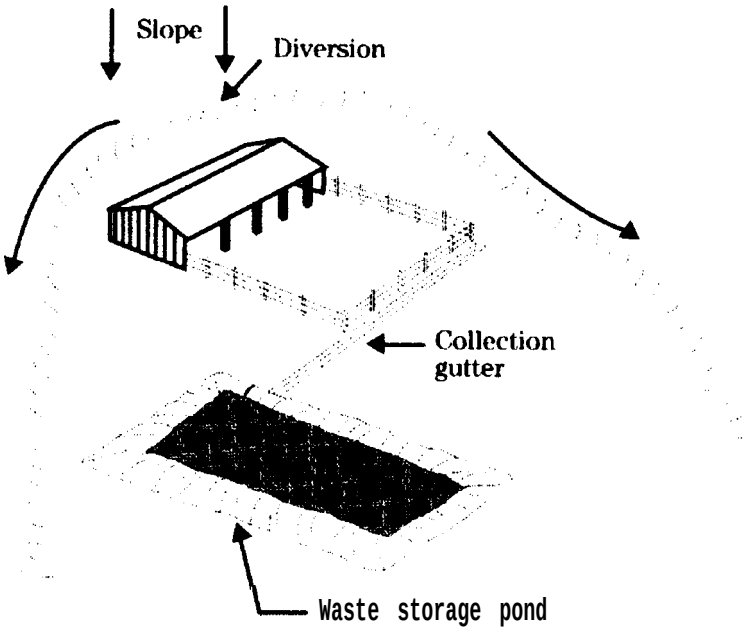
Figure 33 - Waste collection from an unpaved beef feedlot. Clean water is diverted away from feedlot. Solids in contaminated surface runoff settle in sediment basin. Liquid from sediment basin is stored in waste storage pond. Dry solids are stockpiled. Solids may be spread at a land application site.



On unpaved lots, the traffic of the livestock tends to form a seal on the soil that prevents the downward movement of contaminated water. Care must be taken when removing manure from these lots so damage to this seal is minimized. The seal tends to break down after livestock are removed from the lot. To prevent possible contamination of ground water resources, all the manure should be removed from an abandoned lot.

Unroofed confinement areas must have a system for collecting and confining contaminated runoff. On unpaved lots the runoff can be controlled by using diversions, sediment basins, and underground outlets. Curbs at the edge of the lots and reception pits where the runoff exits the lots help to control the runoff.

Figure 34 - Diverting "clean" runoff away from feedlot. Collection gutter carries runoff to waste storage pond.



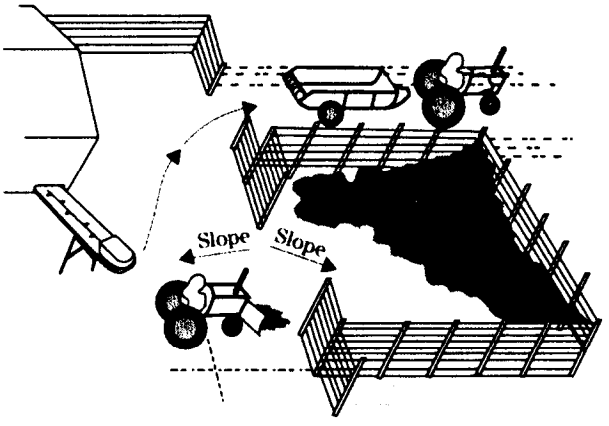
Solid/liquid separators or settling basins can be used to recover some of the solids in the runoff. The volume of runoff can be reduced by limiting the size of the confinement area. Uncontaminated runoff can be excluded by use of diversions.

The manure in confinement areas that have a roof can be collected and stored as a solid. It may also be collected as a solid or semi-solid from open lots where the manure is removed daily.

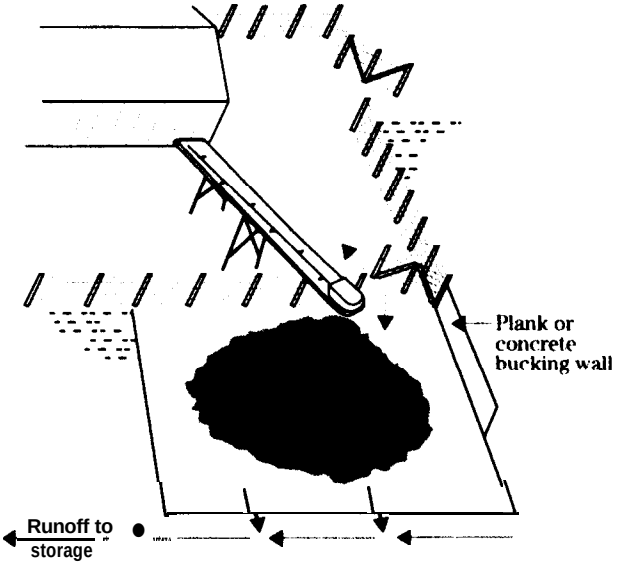
(3) Storage

Manure can be stored as a bedded pack in the confinement area if bedding is added in sufficient quantities. Manure removed from the confinement area can be stored as a (1) liquid or slurry in an earthen pond or **a** structural tank, as a (2) semi-solid in an unroofed structure that allows drainage of excess water and runoff to a waste storage pond, or as a (3) solid in a dry stacking facility designed for storage (figure 35). In areas of high rainfall, dry stacking facilities should be roofed (fig. 36). Contaminated runoff must be stored as a liquid in a waste storage pond or structure.

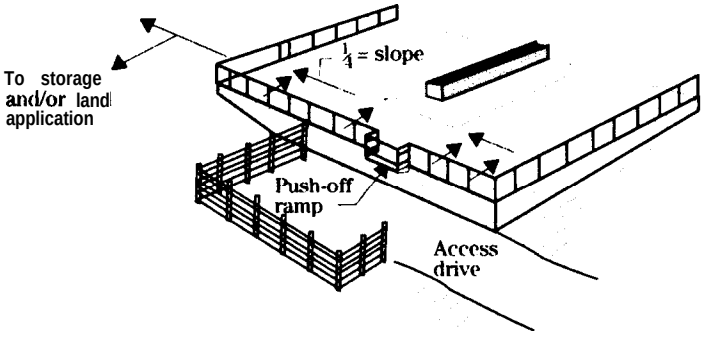
Figure 35 **-** Solid manure stacking facilities.



Barn cleaner to spreader or tractor stacking

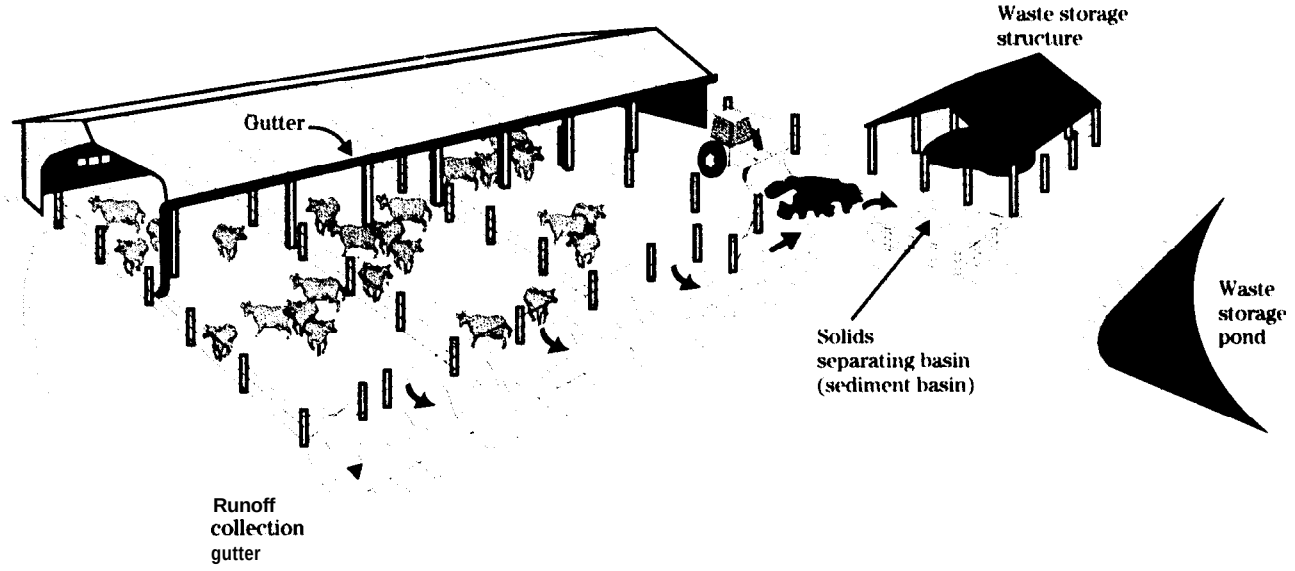


To storage and/or spreader from elevator stacker



Yard layout for sloping sites
Place barrier around loading ramp for safety

Figure 36 - Storage facilities for wastes from paved feedlot in high rainfall area. Building has gutter to reduce the volume of runoff in the feedlot area. Runoff and scraped manure is deposited in sediment basin. Liquids discharge into waste storage pond.



(4) Treatment

Treatment of the waste in a lagoon is difficult for some livestock systems because of the volume of solids in the waste, but many of the solids can be removed before treatment. Liquid waste may be treated in a waste storage pond, an anaerobic lagoon, or other suitable liquid waste treatment facilities. Solid waste can be composted.

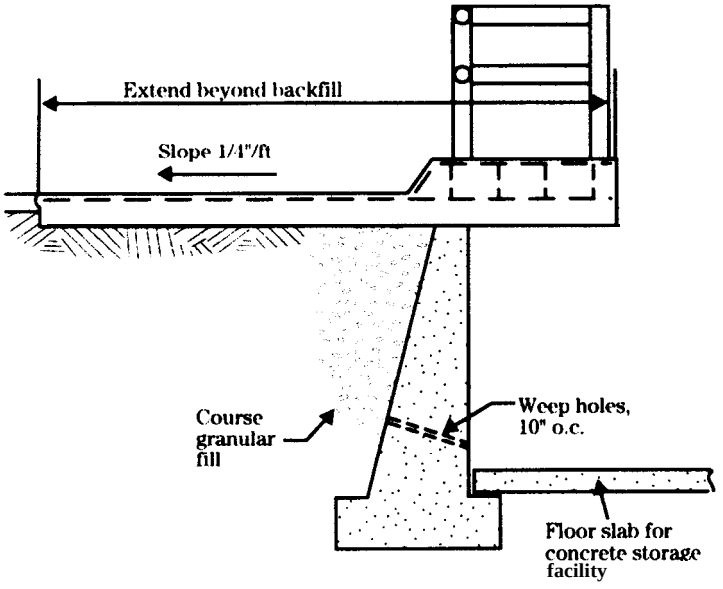
A vegetative filter can be a shallow channel or a wide, flat area of vegetation used to remove solids and nutrients from concentrated livestock area runoff and other liquid wastes. The filters promote filtration, deposition, infiltration, absorption, decomposition, and volatilization of contaminants.

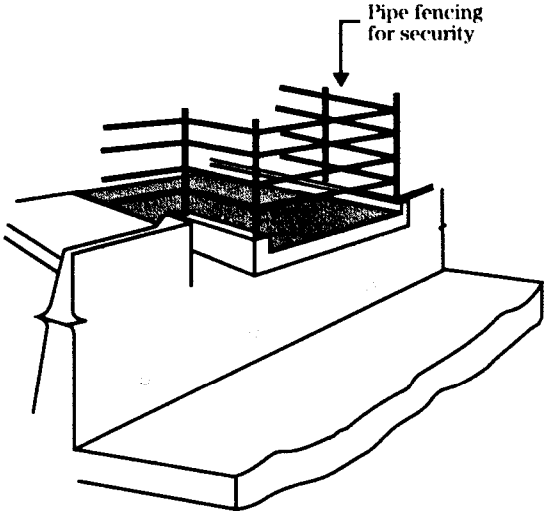
(5) Transfer

The method used to transfer the waste depends largely on the consistency of the waste. Liquid waste and slurries can be transferred through open channels or pipes or in a portable liquid tank. Pumps can be used as needed. Solids and semi-solids may be transferred by using mechanical conveyance equipment, by pushing the waste down curbed concrete alleys, and by transporting the waste in solid manure spreaders.

Manure that is scraped from open lots can be loaded into manure spreaders or storage and treatment facilities using push-off ramps (Figure 37).

Figure 37 – Push-off Ramps.

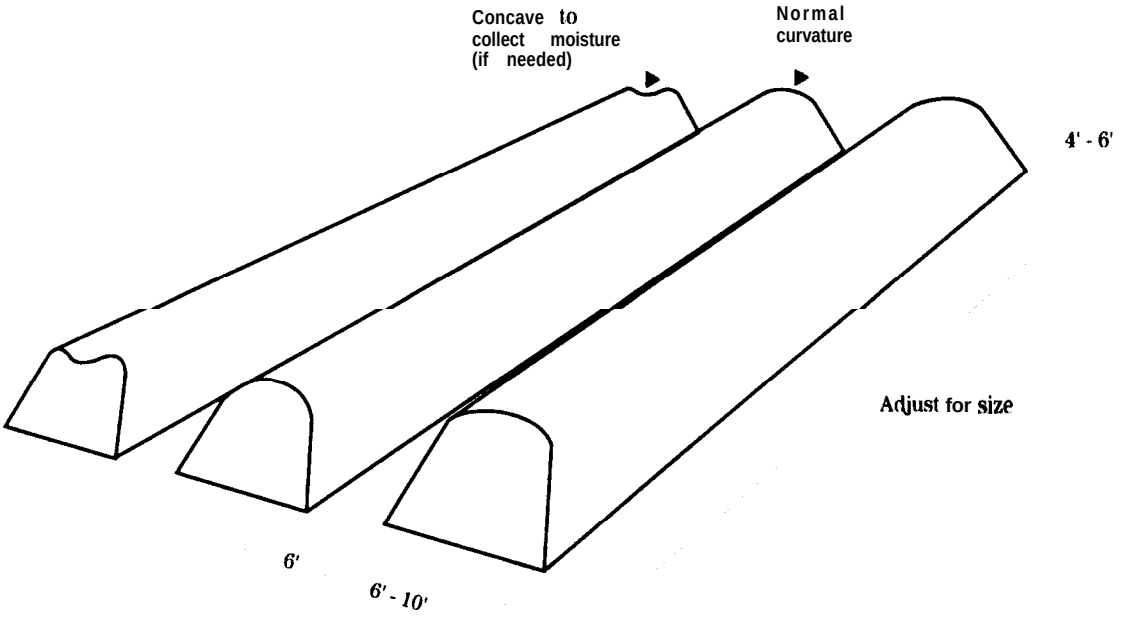




(6) Utilization

The most common form of utilization is land application. Beef cattle waste can be used as bedding for livestock, as an energy source, or it can be marketed as compost (Figure 38). The waste can be hauled and distributed over the land in appropriate spreading devices. Liquid waste and slurries can be distributed through an irrigation system.

Figure 38 - Cornposting reduces the bulk of organic material to be spread; improves its handling properties; reduces odor, fly, and other vector problems; and can destroy weed seeds and pathogens.



Land area needed for disposal is directly related to the treatment applied to the manure, soil, plants, and climatic conditions. The application of waste in the field should not exceed the plant nutrient and water needs.

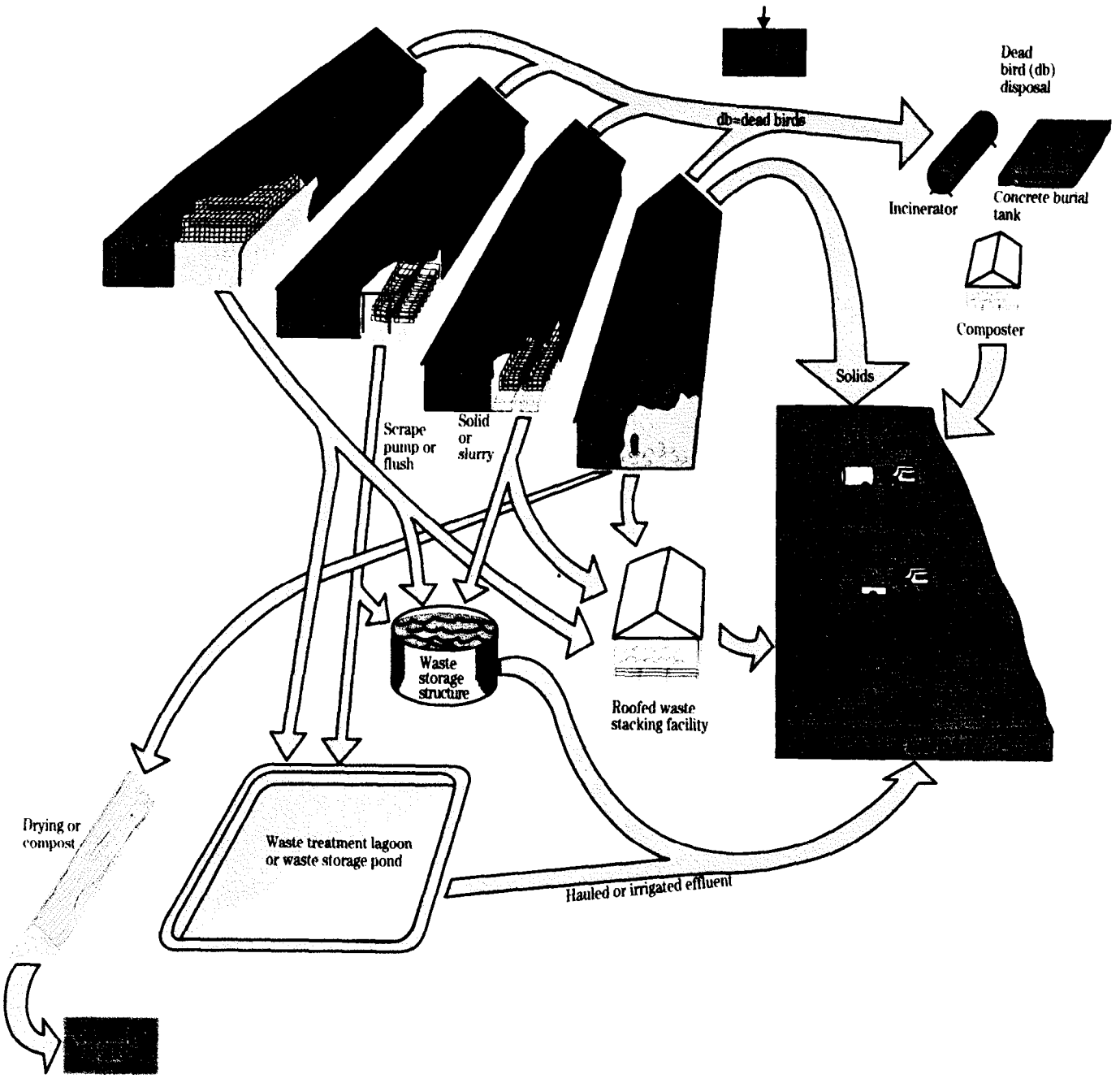
(7) Example

Manure from a 200 cattle feedlot is collected and stored in a stacking facility.

Manure may be spread over 9 acres of pasture per year for disposal. Eighteen acres is needed if the manure is spread on crops with similar nutrient requirements as cabbage. More acres of crop land are required to spread the manure because the pasture grass uses more nutrients than the crop.

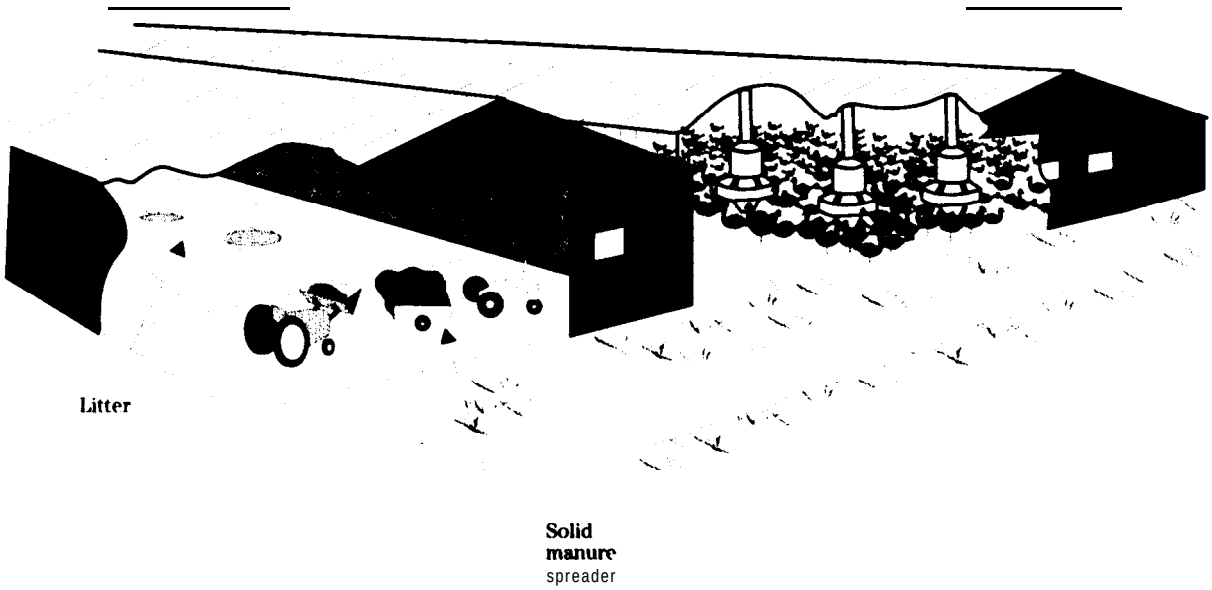
POULTRY WASTE HANDLING COMPONENTS

Figure 39 - Poultry waste handling options



The two basic poultry confinement facilities include those to raise broilers used for meat (Figure 39) and those to house layers. Broilers are grown on floors on beds of litter shavings (Figure 40), sawdust, or nut hulls. Layers are confined to cages. Fly control around layers is important to prevent spotting of the eggs. Disease control is important in both systems.

Figure 40 - Litter system for broilers. Solid manure spreader transports waste for land application or cornposting.



(1) Production

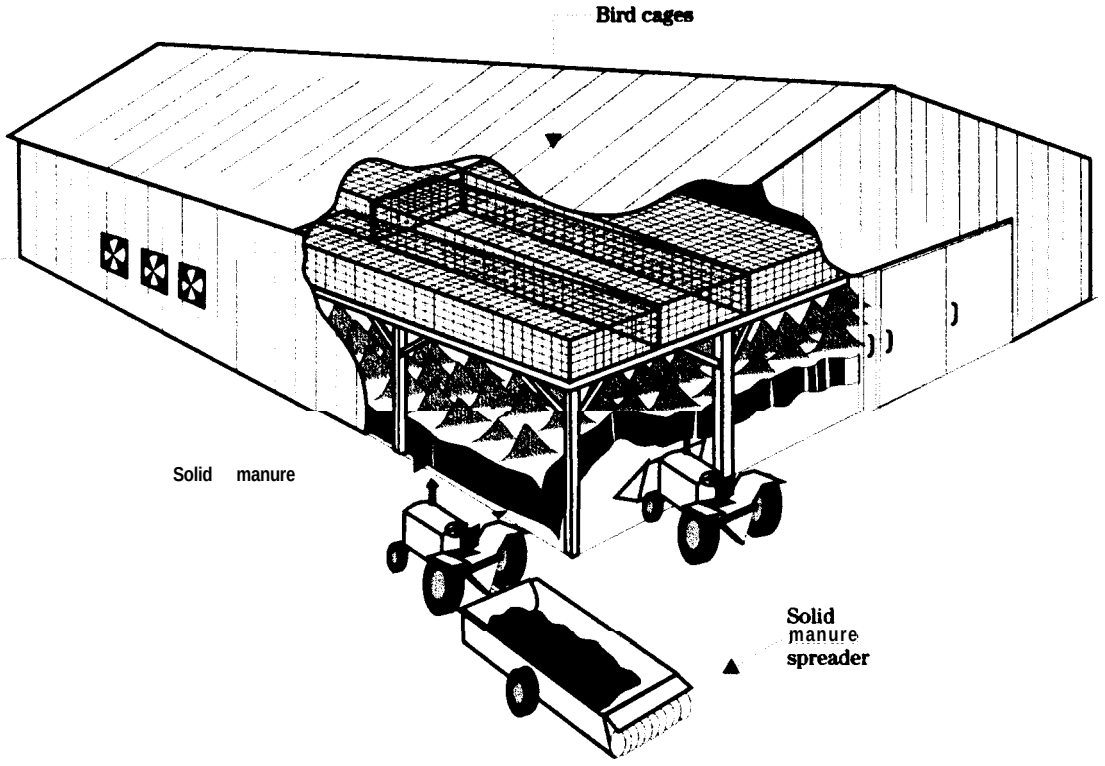
Waste associated with poultry operations includes manure and dead poultry. Depending upon the system, waste can also include litter, wash-flush water, and waste feed.

(2) Collection

The manure from broiler operations is allowed to accumulate on the floor where it is mixed with the litter. Near watering facilities the manure litter pack forms a "cake" that generally is removed between flocks. The rest of the litter pack generally has low moisture content and is removed once a year. The litter pack can be removed more frequently to prevent disease transfer between flocks.

In layer houses, the manure that drops below the cage collects in deep stacks (Figure 41) or is removed frequently using either a shallow pit located beneath the cages for flushing or scraping or belt scrapers positioned directly beneath the cages.

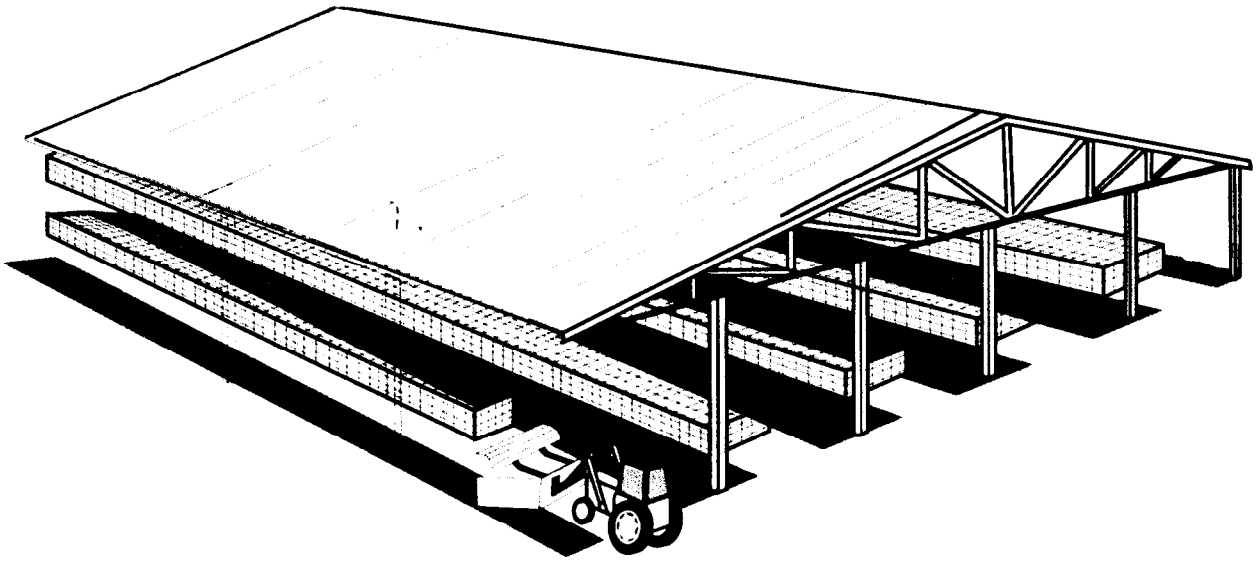
Figure 41 - Manure accumulates under cages in "high-rise" house for layers.



(3) Storage

Litter from broiler operations is stored on the floor of the housing facility (fig. 42). When it is removed, it can be transported directly to the field for land application. If field conditions are not suitable or spreading is delayed for other reasons, the litter must be stored outside the housing facility. In some areas the litter may be compacted in a pile and stored in the open for a limited time; however, it generally is better to cover the manure with a plastic or other waterproof cover until the litter can be used.

Figure 42 - Litter from poultry operations may be stored on the floor of the facility until scraped after several cycles of birds.



If the manure from layer operations is kept reasonably dry, it can be stored in a roofed facility. If it is wet, it should be stored in a structural tank or an earthen storage pond.

(4) Treatment

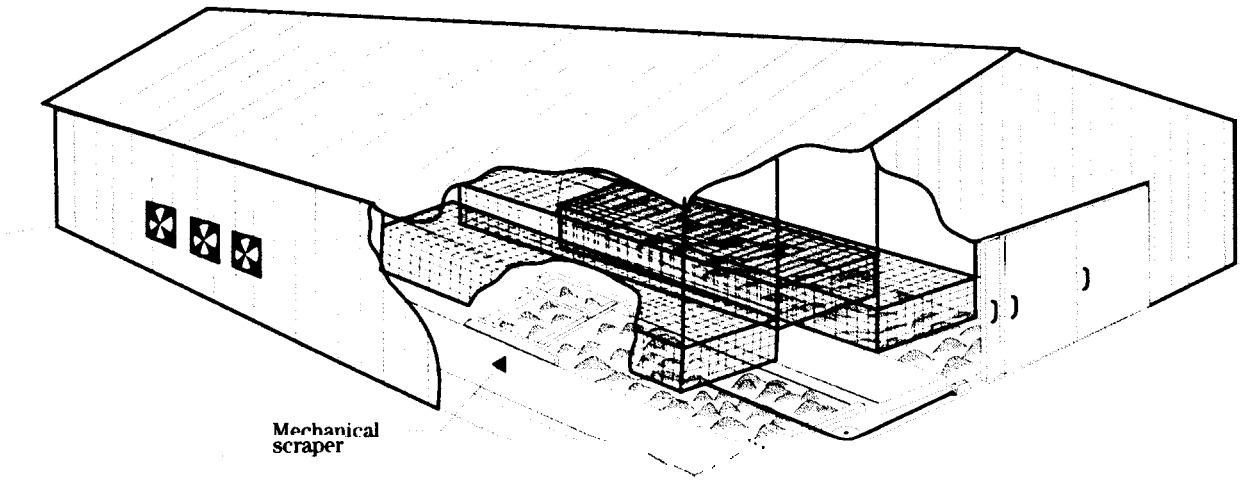
Broiler litter can be composted. This stabilizes the litter into a relatively odorless mass that is easier to market and also helps to kill disease organisms so that the litter can be reused as bedding or supplemental feed for livestock. The litter can also be dried and burned directly as a fuel.

Liquid manure may be placed into an anaerobic digester to produce methane gas or it can be treated in a lagoon. The high volatile solid content of the layer manure may require an anaerobic lagoon of considerable size. If odors are a problem, the lagoon can be aerated.

(5) Transfer

The method used to transfer the waste depends on the solid content of the waste. Liquid waste can be transferred in pipes, gutters, or tank wagons. Dried litter can be scraped (Figure 43), loaded, and hauled as a solid.

Figure 43 - Solid waste may be scraped regularly (possibly by mechanical scraper) from the facility for transport to the field.



(6) Utilization

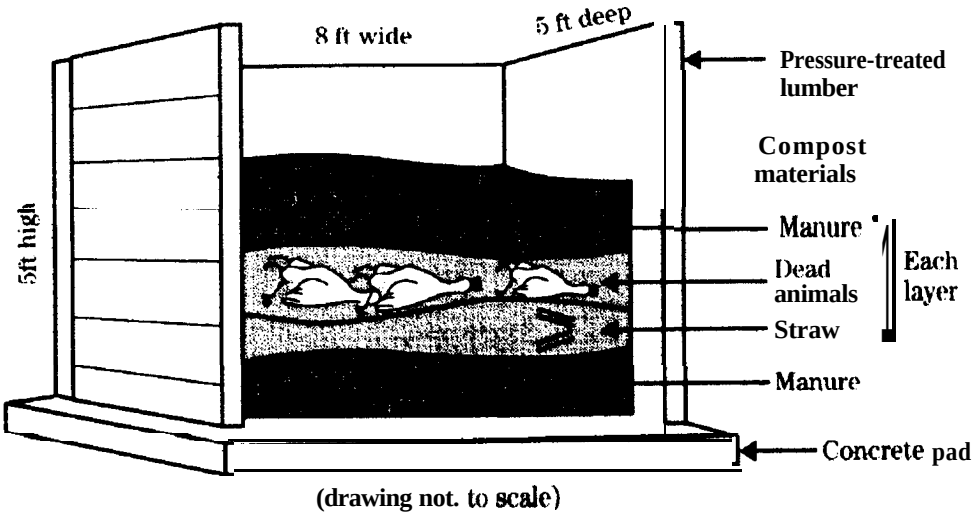
The waste from poultry facilities can be applied to the land. If the owners of the poultry houses do not have enough land suitable for application, they should arrange to apply the waste to their neighbors' land. Whether on the owner's land or the neighbor's land, the waste must be spread according to an appropriate waste utilization plan. Poultry waste can also be used for the production of methane gas, burned directly as a fuel, reused as bedding, or used as a feed supplement for livestock.

(7) Dead poultry disposal

Because of the large numbers of dead birds associated with large poultry operations, the disposal of dead birds is a resource concern. Poultry facilities must have adequate means for disposal of dead birds in a sanitary manner. To prevent spread of disease, the dead birds are often collected daily by hand. Disposal alternatives include incineration, rendering, burial, or cornposting.

Cornposting can be an economical and environmentally acceptable method of handling dead animals. The process produces little odor and destroys harmful pathogens.

Figure 44 - Dead bird cornposting bin. Dead birds are mixed with litter and straw. The composted material is stored until it can be applied to the land.



Land area needed for disposal is directly related to the treatment applied to the manure, soil, plants, and climatic conditions. The application of waste in the field should not exceed the plant nutrient and water needs.

(8) Example

A high-rise layer houses 15,000 chickens. Manure is stored under the houses with no bedding or litter material added to the waste.

When the manure is removed, sufficient land area is needed to spread the waste at the crop nutrient use rate. Nineteen acres of crops with similar nutrient requirements to cabbage are needed to dispose of the manure each year.

APPENDIX 7

PROCESSES TO FURTHER REDUCE PATHOGENS

A. Cornposting:
   1. Windrows shall be turned a minimum of five turnings during a period not less than 15 days with the temperature of the product mixture six to eight inches below the pile surface maintained at 55 degrees Celsius or greater for 24-hours or longer before turning.
   2. Covered aerated static pile and enclosed-vessels shall be maintained at a temperature not less than 55 degrees Celsius for not less than three days. Uncovered aerated static piles shall be turned a minimum of two turnings with the temperature six to eight inches below the pile surface maintained at 55 degree Celsius or greater for 24-hours or longer before turning.

B. Heat Drying: The waste product is dried by direct or indirect contact with hot gases to reduce the moisture content of the sewage sludge to 10 percent or less. Either the temperature of the waste product particles exceeds 80 degrees Celsius or the wet bulb temperature of the gas in contact with the reclaimed product as the product leaves the dryer exceeds 80 degrees Celsius.

C. Heat Treatment: Liquid product is heated to a temperature of 180 degrees Celsius or higher for 30 minutes.

D. Thermophilic Aerobic Digestion: Liquid product is agitated with air or oxygen to maintain aerobic conditions and the mean cell residence time of the product is 10 days at 55 to 60 degrees Celsius.

E. Pasteurization: The temperature of the waste product is maintained at 70 degrees Celsius or higher for 30 minutes or longer.

F. Treatment process that is equivalent to a Process to further reduce pathogens, as determined by the Department.

The process to further reduce pathogen may be achieved through one of the foregoing treatment processes. The treatment effectiveness can be verified by showing that either the density of fecal coliform in the product is less than 1000 MPN per gram of total solids (dry wt. basis), or the density of Salmonella sp. bacteria in the product is less than 3 MPN per 4 grams of total solids (dry wt. basis) at the time the manure is prepared for sale or give away in a bag or other container for land application.

APPENDIX 8

COST INFORMATION

Construction costs for control of runoff and manure from confined animal facilities are provided in Table below. The annual operation and maintenance costs average 4 percent of construction costs for diversions, 3 percent of construction costs for settlement basins, and 5 percent of construction costs for retention ponds (DPRA, 1992). Annual costs for repairs, maintenance, taxes, and insurance are estimated to be 5 percent of investment costs of irrigation systems (DPRA, 1992). Please note that actual costs may vary greatly and are likely to be higher due to Hawaii's high cost of living.

Practice"	Unit	Cost/Unit ($)[b]
Diversion	foot	2.00
Irrigation		
piping (4-inch)	foot	1.75
piping (6-inch)	foot	2.25
pumps (10 hp)	unit	1,750.00
pumps (15 hp)	unit	2,000.00
pumps (30 hp)	unit	3,000.00
pumps (45 hp)	unit	3,500.00
sprinkler/gun (150 gpm)	unit	875.00
sprinkler/gun (250 gpm)	unit	1,750.00
sprinkler/gun (400 gpm)	unit	3,200.00
contract service to de-water storage pond	1,000 gallons	3.00
Infiltration"	acre	2,500.00
Manure Hauling	mile/4.5-ton load	2.15
Dead Animal Cornposting facility	cubic foot	5.00
Retention pond		
241 cubic feet in size	cubic foot	2.58
2,678 cubic feet in size	cubic foot	1.24
28,638 cubic feet in size	cubic foot	0.60
267,123 cubic feet in size	cubic foot	0.31
Settling Basin		
53 cubic feet in size	cubic foot	4.26
488 cubic feet in size	cubic foot	2.74
5,088 cubic feet in size	cubic foot	1.71
49,950 cubic feet in size	cubic foot	1.08

[a] Expected lifetimes of practices are 20 years for diversions, settling basins retention ponds, and infiltration areas and 15 years for irrigation equipment.

[b] 1990 dollars. This table does not present annualized costs.

[c] Does not include land costs.

APPENDIX 9

LIST OF AGENCIES

Hawaii Association of Conservation Districts (HACD). The Hawaii Association of Conservation Districts is an organization of soil and water conservation districts in the State of Hawaii. The HACD pools district experience and develops state policies on a continuing basis. The soil and water conservation districts are legally constituted subdivisions and self-governing units of the Hawaii State government. They are organized under Chapter 180, Hawaii Revised Statutes.

There are 16 Districts in Hawaii. Their primary function is to conduct soil and water conservation activities, including non-point source pollution control. The Conservation Districts promote the conservation, wise use and orderly development of the land, water and natural resources of the State.

Department of Agriculture (DOA). The DOA understands that animal waste regulations must be relevant to Hawaii's environmental situation. The unique character of our island state places the livestock industry almost entirely within the CZM and, to a large extent, the ground water protection areas, which compounds Hawaii's problems.

The DOA seeks compliance. However, these guideline proposals should be economically feasible and realistic to our conditions. Moreover, with the high cost of feed, land and operations, Hawaii's farmers can least afford to be over-regulated. Hence, we should design our regulations to conform to the unique character of our land.

The DOA's position is that changes made must ensure a viable livestock industry while not affecting the health and welfare of the people of our state.

Department of Health, Environmental Management Division (DOH). The mission of the DOH is to provide leadership to monitor, protect and enhance the health and environmental well-being of all the people in Hawaii. The DOH-EMD is responsible for Federal programs to implement the Clean Air Act, Clean Water Act, Safe Drinking Water Act, and Resource Conservation and Recovery Act, State programs to enforce Hawaii Revised Statutes, and implementing and maintaining the statewide programs for Air Pollution Control, Water Pollution Control, Safe Drinking Water, Solid Waste Management, and Wastewater Management.

Governor's Agriculture Coordinating Committee (GACC). The GACC was created by legislative statute in 1976. Its mission is to ensure the vitality of agriculture and the industry's contribution to a diversified and expanding state economy. This is accomplished by serving as a forum and facilitator for

government agencies and the private sector to jointly focus on issues impacting agriculture and the development and coordination of agriculture related public policy and programs.

The committee utilizes existing resources and enables all groups to work collaboratively. The ability of the Committee to respond to emergencies, without having to wait for supplemental legislative funds, is consistent with the precepts of the Hawaii State Plan. This type of response prevents the exacerbation of problems, helps to contain losses, and mitigate adverse effects.

The GACC's composition and duties are specified in Chapter 164 of the Hawaii Revised Statutes.

Hawaii Farm Bureau Federation (HFBF). The purposes for which the HFBF is formed are:

1) To work for the solution of the problems of the farm, the farm home and the rural community by use of the recognized advantages of organized action, to the end that those engaged in various branches of agriculture may have the opportunity for happiness and prosperity in their chosen work.
2) To represent, protect and advance the social, economic and educational interests of the farmers of Hawaii.

University of Hawaii Cooperative Extension Service (CES). The CES is the organized extension unit of the College of Tropical Agriculture and Human Resources at the University of Hawai'i at Manoa. The mission of the CES is to provide educational programs on all aspects of agricultural systems and on the use of related physical and human resources in the communities which it serves.

Regarding confined livestock feeding operations and waste management systems, the CES can assist ranchers and farmers by acquiring, disseminating and applying useful and practical research generated knowledge in tropical agricultural systems. The CES can also facilitate public policy education and provides guidance in the adoption of new technology through its link with the land-grant colleges and interagency collaborations.

USDA Consolidated Farm Service Agency (CFSA). The USDA Consolidated Farm Service Agency . . .

State and County CFSA offices serve as focal points for the administration of the Agricultural Conservation Program (ACP). The ACP is designed to: help prevent soil erosion and water pollution; protect and improve productive farm and ranch land; conserve water used for agriculture; preserve and develop wildlife habitat; and encourage energy conservation measures. It is a joint effort by agriculture producers, Federal and State agencies and other groups to restore and protect the Nation's agricultural land and water resources and preserve the environment. Cost-sharing is provided to farmers and ranchers to

encourage the carrying out of approved conservation and environmental protection practices on agricultural land that will result in long-term public benefits. Farmers or ranchers may also enter into pooling agreements to cooperatively solve mutual conservation problems. The Federal Government may share up to 75 percent of the cost to install practices under the annual agreements or up to 80 percent for certain low-income producers.

USDA National Resources Conservation Service (NRCS). The NRCS helps individuals, groups, organizations, cities and towns, and county and state governments reduce the costly waste of land and water resources and put these national assets to good use. The guiding principle is the use and conservation treatment of the land in harmony with its capabilities and needs.

The NRCS mission covers three major areas: soil and water conservation, natural resource surveys, and community resource protection and management. To carry out its mission, the NRCS has a nationwide network of conservation specialists to help people understand and protect the land and water resources while they use them beneficially. The NRCS-Hawaii, with field offices in each county, provides technical assistance through the conservation districts in the planning and designing of animal waste management facilities and systems.

APPENDIX 10

DEFINITIONS

"Animal feeding operation" means a lot, facility or pursuit conducted on land zoned by the county for the commercial agricultural production of livestock or livestock products where the following conditions are met:

a) Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period;
b) Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility; and
c) Two or more animal feeding operations under common ownership are considered, for the purposes of these regulations, to be a single animal feeding operation if they adjoin each other or if they use a common area or system for the disposal of wastes.

"Animal unit" means a unit of measurement for any animal feeding operation calculated in the following manner:

a) The number of slaughter and feeder cattle multiplied by 1.0,
b) plus mature dairy cattle multiplied by 1.4;
c) plus dairy stock multiplied by 0.6;
d) plus swine weighing over 55 pounds multiplied by 0.4;
e) plus swine weighing less than 55 pounds multiplied by 0.03;
f) plus sheep, lambs or goats multiplied by 0.1;
g) plus horses multiplied by 2.0;
h) plus turkeys multiplied by 0.018;
i) plus laying hens or broilers multiplied by 0.01 (if the facility has continuous overflow watering);
j) plus laying hens or broilers multiplied by 0.033 (if the facility has a liquid manure handling system);
k) plus ducks multiplied by 0.2.

"Aquifer" means a geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well, tunnel or spring.

"Back-flow" means the flow of water or other liquids, mixtures, or substances into the distributing pipes of **a** potable supply of water from any source or sources other than its intended source.

"Chronic" means marked by long duration or frequent recurrence.

"Clean Water Act" means Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq., Public Law 92-500, enacted by the Congress October 18, 1972, as amended by Public Law 95-217, enacted December 27, 1977, as amended.

"Concentrated animal feeding operation" means an "animal feeding operation" which meets the criteria in 40 CFR 122, APPENDIX B, or which the Director designates under 40 CFR 122.23(c).

"Critical Water Disposal Area (CWDA) maps" means the maps indicating the boundaries of the critical disposal wastewater areas established pursuant to Hawaii Adminstrative Rules (HAR) Section 11-62-05(a) and dated March 16, 1990.

"Director" means the director of health or the director's duly authorized agent.

"Effluent" means any substance including but not limited to, sewage, waste, garbage, feculent matter, offal, filth, refuse, any animal, mineral, or vegetable matter or substance, and any liquid, gaseous, or solid substance.

"Established date of operation" means the date on which the livestock operation commenced operations. If the livestock operation's facilities, whether land or improvements, are subsequently expanded, the date of commencement of the expansion shall be a separate and independent established date of operation. The commencement of any expansion of an operation shall not divest the operation of a previously established date of operation.

"Existing livestock operation" means any livestock facility or waste system construction or operation approved prior to the effective date of this guideline.

"Expansion" means the increase in land used by the animal feeding operation or any increase in buildings, equipment that is fixed in place, or other permanent structures. Expansion does not include a change or addition to the type of livestock provided such change or addition exhibits the use of reasonable care

"Feedlot" means an animal feeding operation in the following subcategories: Beef cattle – open lots; beef cattle – housed lots; dairy cattle – stall barn (with milk room); dairy – free stall barn (with milking center); dairy – cow yards (with milking center); swine – open dirt or pasture lots; swine – housed, slotted floor; swine – solid concrete floor, open or housed lot; horses – stables (race tracks); chickens – broilers, housed; chickens – layers (egg production), housed; chickens – layers breeding or replacement stock, housed.

"Feedlot run-off" means contaminated liquid flowing from any animal feeding operation caused by precipitation or other water sources falling on, passing over, across or through an animal

feeding operation or otherwise coming into direct contact with the animals confined in an animal feeding operation.

"Formation" means a body of rock characterized by a degree of lithologic homogeneity or similarity which is prevailingly, by not necessarily, tabular and is mappable on the earth's surface of traceable in the subsurface.

"Ground water: means water below the land surface in a zone of saturation.

"Holding pond" (may also be known as an oxidation pond or lagoon) means any excavated, diked or walled structure or combination of structures designed for the interception and temporary storage of feedlot run-off or process-generated wastewater.

"Holding tank" means a non-portable, watertight closed vault to temporarily hold wastewater.

"Impermeable" means not permitting significant passage of fluids under the usual pressure differences found in constructed livestock feedlot facilities and waste system.

"Lagoon" means any excavated, diked or walled structure or combination of structures designed for biological stabilization and storage of livestock waste and process-generated wastewater.

"Leachate" means fluids containing materials removed from livestock waste.

"Liquid waste" means fluids derived from livestock waste which contain dissolved organic and inorganic solids.

"Livestock" means animals kept or raised for use or profit to include the fowl, sheep, goat, cattle, swine, horse and other commercially-produced animals.

"Livestock facility" means any animal feeding operation, feedlot, livestock shelter, feed storage and preparation area, shelter, on-farm milking and accompanying milk-handling area.

"Livestock operation" see "animal feeding operation"

"Livestock shelter" means any covered or open structure, including but not limited to livestock houses, barns, or lots in which livestock are confined at any time.

"Manmade ditch" means a discrete fissure or channel excavated in the earth for the purpose of transporting livestock waste. This is not to be confused with a vegetative filter or acceptable

disposal area which is a treatment device or system and may take the form of a man-made terrace or grassed waterway system.

"Manure storage structure" means any permanent area or structure used for stacking, storing or containing of livestock waste.

"Modification" means any addition or alteration to the approved operational or structural plan(s) of any livestock production or processing facility, and its waste system which can ultimately have an impact to either groundwater or surface water resources.

"New Livestock management/waste-handling facility" means any livestock management or livestock waste-handling facility that is constructed or modified commencing on or after the effective date of this guideline.

"NPDES" means the National Pollution Discharge Elimination System for issuing, establishing conditions for and denying permits under Section 402 of the Clean Water Act (CWA). All terms used in connection with NPDES which have been defined in the CWA or regulations adopted thereunder shall have the meanings specified therein, unless specifically noted otherwise.

"NPDES permit" means a permit issued pursuant to the NPDES program.

"Owner" means any person who owns, leases, controls or supervises a livestock facility or waste system.

"Person" means any individual, partnership, co-partnership, firm, company, trust, estate, political subdivision, state agency or any other legal entity, or their legal representative, agent or assigns (as the same meaning as defined in section 342D-1, HRS).

"Pest management" means the utilization of a coordinated multiple control approach to secure the precision control of vectors, which includes but is not limited to a combination of chemical, biological, physical, mechanical, and environmental control measures.

"Process generated waste, or waste" means livestock excreta to also include associated feed losses, bedding, wash waters, sprinkling waters from livestock cooling, livestock carcasses, renderings, blood, or other potential contaminants used in or resulting from the production or processing of livestock.

"Putrescible waste" means those waste materials of organic origin capable of breeding, harboring, or serving as nutrient sources for vectors.

"Solids" means livestock excreta or matter containing both particulate and dissolved organic and inorganic solids which does not contain excessive moisture. A "funnel" test should not result in the drainage of liquid from the manure mass.

"Sludge" means the accumulated livestock waste solids removed from wastewater by any liquid-solid separation process. Such solids may be part of the raw wastewater or wastewater from a treatment system.

"Slurry" means animal excreta or matter there from derived which contain dissolved and particulate organic and inorganic solids that have a characteristic of a fluid.

"Standard of Performance" means a standard for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Director determines to be achievable through application of the best demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.

"State waters" means all waters, fresh, brackish, or salt, around and within the State, including, but not limited to, coastal waters, streams, rivers, drainage ditches, ponds, reservoirs, canals, ground waters, and lakes; provided that drainage ditches, ponds, and reservoirs required as a part of a water pollution control system are excluded.

"Vector" means an organism, usually an insect or other arthropod, rodent or other animal, capable of transmitting the causative agents of diseases or affecting public health and well being.

"Wastewater" means any liquid waste, whether treated or untreated, and whether animal, mineral or vegetable, including agricultural, industrial and thermal waste.

"Waste system" means, individually or collectively, those constructions or devices, except sewers, used to collect, store, treat, transfer, dispose, recover or agriculturally-utilize livestock waste or livestock processing waste. Such a facility includes acceptable disposal areas, such as pasture or other suitable agricultural land in active production, which can serve as an adequate filtering device to settle out and or assimilate pollutants from livestock and livestock processing waste.

"Water pollutant" means dredged soil, solid refuse, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat,

wrecked or discarded equipment, rock, sand, soil, sediment, cellar dirt and industrial, municipal and agricultural waste.

"Water pollution" means such alteration of the physical, thermal, chemical, biological or radioactive properties of any waters of the State, or such discharge of any contamination into any waters of the State, as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate uses, or to humans, livestock, wild animals, birds or fish or other aquatic life.

APPENDIX 11

REFERENCES

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